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U.S. Fish and Wildlife Service
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AESO/SE
2-21-98-F-399 July 29, 1999

John McGee, Forest Supervisor
Coronado National Forest
300 W. Congress
Tucson, Arizona 85701

RE: On-going and Long-term Grazing Consultation

Dear Mr. McGee:

This document transmits the Fish and Wildlife Service's final biological opinion on the proposed On-going and Long-term Grazing on the Coronado National Forest (Forest) in New Mexico (Hidalgo County) and Arizona (Cochise, Santa Cruz, Pima, Pinal, and Graham Counties) following section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your November 5, 1998, request for formal consultation was received on November 5, 1998. By letter of March 26, 1999, we extended the 90-day consultation period by 60 days. The draft biological opinion was delivered to you on April 16, 1999. We received your comments on the draft opinion and a summary of applicant comments and their original comments on June 21, 1999.

We appreciate the cooperation and assistance of your staff and permittees during the consultation period. We look forward to assisting the Coronado National Forest with the implementation of this biological opinion. If you have any questions on the biological opinion please contact me or Doug Duncan (520/670-4860).

Sincerely,

/s/ David L. Harlow
Field Supervisor

2 Enclosures:
biological opinion
zip disk

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GARD-AZ/NM, PARD-ES)
Field Supervisor, New Mexico Ecological Services Field Office, Albuquerque, New Mexico

DKD:finalbo.cnf

BIOLOGICAL OPINION

On-going and Long-term Grazing
on the Coronado National Forest

Arizona Ecological Services Field Office
US Fish and Wildlife Service

AESO/SE 2-21-98-F-399

July 29, 1999

BIOLOGICAL OPINION
AESO/SE 2-21-98-F-399

On-going and Long-term Grazing
on the Coronado National Forest

This biological opinion was prepared by the US Fish and Wildlife Service (Service) based on our review of the proposed On-going and Long-term Grazing on the Coronado National Forest (Forest) in New Mexico (Hidalgo County) and Arizona (Cochise, Santa Cruz, Pima, Pinal, Graham counties), and its effects on the endangered Mexican long-nosed bat (*Leptonycteris nivalis*), endangered lesser long-nosed bat (*L. curasoae yerbabuenae*), threatened New Mexico ridge-nosed rattlesnake (*Crotalus willardi obscurus*), endangered American peregrine falcon (*Falco peregrinus anatum*), endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) with critical habitat, endangered Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*) with critical habitat, endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*), endangered Yaqui chub (*Gila purpurea*) with critical habitat, and endangered Sonora tiger salamander (*Ambystoma tigrinum stebbensi*) following section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The Forest also requested Service concurrence with your "not likely to adversely affect" determinations. You made "not likely" determinations on the following species: black-footed ferret (*Mustela nigripes*), jaguar (*Panthera onca*), lesser long-nosed bat, American peregrine falcon, aplomado falcon (*F. femoralis septentrionalis*), Mexican spotted owl (*Strix occidentalis lucida)*, bald eagle (*Haliaeetus leucocephalus*), cactus ferruginous pygmy-owl, masked bobwhite quail (*Colinus virginianus ridgeway*), Southwestern willow flycatcher (*Empidonax traillii extimus*), Huachuca water umbel, Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*), and Gila topminnow. There were about 400 of these determinations. The basis for our concurrences is found in the appendix. You also requested concurrence that the proposed threatened Chiricahua dock (*Rumex orthoneurus*) was not likely to be jeopardized. The Service concurs with all "not likely to adversely affect" determinations for black-footed ferret, lesser long-nosed bat, American peregrine falcon, bald eagle, masked bobwhite quail, Southwestern willow flycatcher, Pima pineapple cactus, and Gila topminnow. The Service conditionally concurs with some not likely determinations for the Mexican spotted owl and jaguar. The Service did not concur with all allotments with not likely to adversely to affect determinations for the cactus ferruginous pygmy-owl, and for the Mescal and Lone Mountain/Parker Canyon allotments for the Mexican spotted owl. These allotments underwent formal consultation following personal communications with the Forest and your letters of April 7, and June 18, 1999.

This biological opinion is based on information provided in the November 1998 biological assessment, correspondence between the Service and Forest Service, numerous telephone and personal conversations, field investigations, correspondence from, and meetings with, applicants and the Arizona Game and Fish Department (AGFD), and other sources of information. The proposed action was modified or clarified in letters from the Forest to the Service on March 12, April 2, April 7, and June 18, 1999. References cited in this biological opinion are not a complete bibliography of all literature available on the species of concern, livestock grazing and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

After reviewing the status of the listed species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the endangered Mexican long-nosed bat, endangered lesser long-nosed bat, threatened New Mexico ridge-nosed rattlesnake, endangered American peregrine falcon, endangered cactus ferruginous pygmy-owl with designated critical habitat, endangered Huachuca water umbel with designated critical habitat, endangered Gila topminnow, endangered Yaqui chub with designated critical habitat, and endangered Sonora tiger salamander. The proposed project will not adversely modify or destroy any designated critical habitat.

Because of the length of this biological opinion, we have included the following table of contents:

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CONSULTATION HISTORY

The Coronado National Forest Plan (USFS 1985) was the subject of a formal section 7 consultation, resulting in a biological opinion dated December 6, 1985 (2-21-83-F-012). Numerous grazing projects (i.e., pipelines, fences), grazing permits, and allotment management plans on the Coronado National Forest have undergone site-specific formal and informal consultation. Other actions on the Forest that might affect the environmental baseline have also been through consultation. The Coronado National Forest has been working toward compliance with the Endangered Species Act for the livestock grazing program since 1997. The Service has been involved during this process.

Existing Forest Plans in the Forest Service's Southwestern Region (which includes the Coronado) underwent formal consultation for their effects to Mexican spotted owl and designated critical habitat (November 25, 1996; 000032RO). New standards and guidelines for the Mexican spotted owl and northern goshawk (*Accipiter gentilis*) proposed as Forest Plan amendments were also addressed in a formal consultation (November 25, 1996; 000031RO). The proposed action for the second consultation was the implementation of the amended standards and guidelines on all Forests. In considering the effects of the proposed action, the Service assumed "that activities will be planned within the bounds of the amended guidelines for the Mexican spotted owl as well as the grazing management guidelines. General utilization standards for given range conditions and management strategies are provided in the guidelines for grazing management, with the provision that they be applied in the absence of more specific guidelines currently established through site-specific National Environmental Policy Act (NEPA) analysis for individual allotments" (pgs. 23-24). Therefore, if no NEPA analysis of forage utilization guidelines has been done, the utilization table in the amended Forest Plan applies to all other allotments. Although these previous consultations were not site-specific evaluations, they did provide direction for the implementation of site-specific grazing management.

The Forest Plans, as amended, for all Southwestern Region Forests have been consulted on for species other than the Mexican spotted owl. The biological opinion was completed December 19, 1997 (000087RO). Management direction on the Coronado National Forest, including livestock grazing, was considered in the consultation.

A biological opinion on livestock grazing on 21 allotments in the Southwestern Region was completed on February 21, 1999. Two allotments on the Coronado were included in that consultation, and are not considered in the present consultation.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The action proposed by the Forest and being analyzed in this biological opinion is the continued grazing of domestic livestock on 187 allotments. Roads, or other range projects, are included in the proposed action. Only some projects for some species are covered by this consultation. Additional information was necessary to complete consultation on all projects for all species. Prescribed fire is not considered. The proposed livestock grazing may be short-term (up to three years) or long-term (up to 10 years). The proposed use is the same as the permitted use for most of the allotments. Any changes to a proposed season of use, permitted or proposed numbers, permitted or projected Animal Months (AM's), or vegetation utilization will require the Forest Service to analyze the effects of that action. Additional section 7 consultation may be required.

The February 13 (USFS 1998a) guidance criteria apply too ongoing grazing authorized through existing term grazing permits. These criteria can only be applied to short-term actions (less than three years). Guidance criteria issued August 25 (USFS 1998b) apply to grazing permits that authorize grazing for up to 10 years (long-term). There are 58 allotments on the Forest analyzed under the long-term guidance criteria. These allotments have already undergone NEPA analysis (after 1992) and have existing permits. The permits expire between December 31, 2002, and December 31, 2007. The proposed action for the 58 long-term allotments is the continuation of current management. This biological opinion for livestock grazing on the long-term allotments will apply until the end of a respective permit (USFS 1998c:I-3 - I-4), or until the standard criteria for reinitiating section 7 consultation apply. Allotments with "not likely to adversely affect" determinations must have an annual confirmation that the guidance criteria are still being met (USFS 1998b).

This biological opinion will be in effect for activities authorized for the 129 short-term allotments for three years from the date of issuance. The standard section 7 reinitiation criteria also apply to these allotments. Many of the 129 allotments may have NEPA decisions completed on Allotment Management Plans (AMP's) before the three-year period expires. If not, additional section 7 consultation may be required after three years. Separate consultation applying the August 1998, guidance criteria would be required for those allotments with new or revised AMP's.

Annual Operating Instructions (AOI's) for all allotments will remain unchanged after any terms and conditions from this biological opinion are included. Any changes in the proposed action will require the Forest to analyze the new proposed action to determine if there are additional effects to listed species not considered in the 1998 BA or this biological opinion. Changes in the proposed action may require reinitiation of consultation. The 1998 AOI's for allotments without NEPA analysis (short-term allotments) included utilization standards from the amended Forest

Plan. Standards and guidelines for the Mexican spotted owl and riparian areas should also have been included in the AOI's.

Because of discrepancies in the proposed action and Appendix B of the BA, the action under consultation for several allotments required Forest clarification (Carol Boyd, Coronado National Forest, pers. comm., March 11, 1999). Several allotments (Oak and Coal Mine) have proposed Animal Months greater than permitted. The permitted number is in error, and should be the same as the proposed action. Some differences resulted because two methods were used to calculate AM's (Alisos/Sierra Tordilla, San Rafael). Other allotments have proposed numbers higher than permitted when the actual season of use will be less than permitted. In these situations, the proposed AM's will not be greater than permitted AM's (Hawk Hollow, Copper Creek, Two Troughs, and Laurel Canyon/South Reef). The Forest's letter of June 18, 1999 contained updated soil and range condition for data collected after the BA was completed and corrections of grazing descriptions in the BA. These changes are reflected in the proposed action tables.

The AMP for the Willow Creek allotment allows 185 livestock. Proposed AM's will be 185 less than what is allowed in the AMP. The permit has not been updated to reflect the AMP.

The proposed number for the Copper Canyon allotment is twice what is permitted; 120 instead of 60 livestock. However, only half the permitted season of use is used. Therefore, proposed AM's are the same as permitted (300). Livestock are grazed November 1 to mid-January one year, and then mid-January to March 31 the next year.

A total of 100 livestock is scheduled to graze the Lyle Canyon allotment with 50 of them on a temporary permit. The previous permit allowed 100 head, but when the permit was sold, only 50 head were being grazed. The new permit was issued for 50 head. Continuing NEPA analysis will determine what the stocking rate will be adjusted to, if at all. The proposed action is for 100 cattle-year-long (CYL).

Post Canyon allotment is grazed by more livestock, for a shorter time, than is permitted. One reason for the discrepancy between the permitted and proposed numbers is that the Forest Service allotment is only 20 percent of the ranch. The proposed action is 450 head for no more than about three months.

Proposed use on the Maverick allotment is for 278 head. Use during the year may vary and may include summer or winter grazing. Grazing can be for about eight months and may occur in one continuous period or be discontinuous during the year. Both summer and winter grazing may occur in the same year. Proposed AM's are 2,208 and will not be exceeded.

Actual use on Hawk Hollow allotment is usually five months or less. AM's will not be greater than permitted.

Two Troughs allotment is grazed with the Cedar Springs allotment. The proposed grazing rotation is for 250 head for five winter months between the two allotments. The actual AM's will not exceed the proposed number of 530 head.

The proposed action for the Happy Valley allotment is the latest proposal in the current NEPA analysis. A range analysis conducted in 1995 showed allotment capacity to be 183 CYL. The proposed action is 165 CYL. The long-term guidance criteria will be applied (USFS 1998b).

The proposed action for the Lone Mountain allotment was changed in an April 2, 1999, letter from the Forest Supervisor (Coronado National Forest) to the Field Supervisor (Arizona Ecological Services). The changes were made to protect the Huachuca water umbel and its proposed critical habitat, but may also provide benefits for the Mexican spotted owl. The proposed action is for ten years, as opposed to the three years noted in the BA. The permit would be for 650 to 950 CYL.

The lower portion of Scotia Canyon would be fenced from livestock for a minimum of five years. After five years, a determination would be made if continued exclosure is necessary. The Wakefield and Peterson pastures would only be grazed December through March when winter rains are adequate to encourage livestock dispersal. The Bear Canyon riparian pasture will be rested until the Forest, the Service, and the permittee determines enough residual biomass has accumulated on the streambanks. Grazing would then occur only in the winter. The following protections will apply to riparian areas in Wakefield, Peterson, and Bear Canyon pastures when livestock are present:

- retain an average residual stubble height on deergrass (*Muhlenbergia rigens*) of 25.4 cm (10 in) on sod-forming plants and 33.02 cm (13 in) on solitary plants;
- upland utilization will not exceed 35 to 45 percent of annual herbaceous forage;
- utilization of annual growth of apical meristems of riparian broad-leaved trees less than 2 meters (6 ft) tall will not exceed 30 percent;
- livestock cannot alter more than 10 percent of the alterable streambank.

If the above protections are exceeded, livestock will be removed from that pasture.

There are five allotments included in this consultation that have no grazing proposed. The Wakefield and Ash Canyon/Carr Canyon allotments have zero proposed numbers of livestock. The Collins Canyon and Brown Canyon allotments are vacant at this time. Any changes to the proposed season of use, permitted or proposed numbers, permitted or projected Animal Months, or vegetation utilization will require the Forest Service to analyze the effects of that action. Additional section 7 consultation may be required.

The corrections made in the June 18, 1999 letter are described below. The permitted and projected use for the Crittenden allotment is 165 cow/calf from 3/1 to 2/28. The projected AM's are 1980 and the hectares per AM are 1.5 (3.6 ac/AM). The projected use on the San Rafael allotment is 475 cow/calf from 3/1 to 2/28. The Black Rock allotment has a 2-pasture Santa Rita rotation grazing system. Soil condition information was updated for the Black Diamond, Robertson, Cross S, Fresnel, Jarillas, Sardina, and Canada del Oro allotments. Range condition information was updated for Canada del Oro allotment.

Also in the June 18, 1999 letter, the Forest clarified its procedure regarding drought.

> "The Coronado National Forest will implement the policy when rainfall for the water year (beginning October 1) is less than 75% of normal by March 1 and the long-range forecast is for less than normal precipitation."
>
> "The Forest shall notify all permittees of the conditions and the need to look at ways to limit livestock pressure on the land. Permittees will work with (the) District Ranger and District Range Specialists to determine the best way to address the situation on their allotment. There is not a single answer for the entire Forest but there are basically 2 ways to limit livestock pressure: either reduce numbers or reduce the amount of time on an allotment or in a pasture."
>
> "If the summer rains are less than 75% by September 1, additional measures may be needed."
>
> "While the Forest doesn't have a specific method that will be implemented, the allowable use set for an allotment will not be exceeded. On allotments or pastures with restrictions on season of use that are tied to wildlife needs (such as breeding season restrictions), these will not be violated."

Allotment Name	Barboot	**Allotment Number**	122
5th Code Watershed	White Water Draw	**4th Code Watershed**	White Water Draw
Allotment Acres **Total Acres** **Capable Range**	 10381 10274	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 2700 3.8
Permitted Use	450 cow/calf; 11/1-6/30	**Projected Use**	450 cow/calf; 11/1-6/30
		Utilization Level	50% max utilization
Major Drainage	Leslie Canyon	**Elevation**	5200 to 6200 feet
Major Vegetation type	desert grassland; chaparral		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	- Repair earth dam - Drill well - Reconstruct FB fence		
Allotment Condition	- The overall trend of the allotment is static. 5% of the allotment is in moderately high range condition with an upward trend, 80% is moderately high with a static trend and 15% is moderately low with a downward trend. - 10% of the allotment is in satisfactory soil condition and 90% is in unsatisfactory condition.		
Management Actions that contribute to effects	**LAA** (likely to adversely affect) - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB = lesser long-nosed bat) - Utilization level exceeds 45%. (LNB) **NLAA** (not likely to adversely affect) - Livestock grazing occurs in riparian areas. (JAG = jaguar) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO = Mexican spotted owl) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF = American peregrine falcon)		

Allotment Name	Big Bend	**Allotment Number**	124
5th Code Watershed	White Water Draw	**4th Code Watershed**	White Water Draw
Allotment Acres **Total Acres** **Capable Range**	 7832 6669	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 2448 2.7
Permitted Use	400 cow/calf; 11/1-4/30 8 cow/calf; 11/1-4/30; private land permit	**Projected Use**	400 cow/calf; 11/1-4/30, 8 cow/calf; 11/1-4/30; private land permit
		Utilization Level	50% max utilization
Major Drainage	Big Bend Creek	**Elevation**	5000 to 6400 feet
Major Vegetation type	desert grasslands		
Type of grazing system	5 pasture rotation		
Planned Improvements	- Pipeline extension and trough		
Allotment Condition	- The overall trend for the allotment is static. 20% of the allotment is in moderately high range condition with an upward trend and 80% is moderately high with a static trend. - 15% of the allotment is in satisfactory soil condition and 85% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Boss	**Allotment Number**	126
5th Code Watershed	San Bernardino Valley	**4th Code Watershed**	San Bernardino Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	734	**Animal Months**	407
Capable Range	734	**Acres per animal month**	2.6
Permitted Use	32 cow/calf; 3/1-2/28 3 horses; 3/1-2/28	**Projected Use**	25 yearlings 9/1-7/31; 20 bulls 9/1-2/28; 4 horses 3/1-2/28
		Utilization Level	45% utilization in growing season, 50% utilization in dormant season
Major Drainage	none	**Elevation**	4850 to 5200 feet
Major Vegetation type	desert grassland		
Type of grazing system	4 pasture season long		
Planned Improvements	- Reconstruct division fence - Construct pasture division fence		
Allotment Condition	- The overall trend of the allotment is static. 5% of the allotment is in moderately high range condition with a static trend and 95% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition and 50% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Bruno	**Allotment Number**	120
5th Code Watershed	White Water Draw	**4th Code Watershed**	White Water Draw
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7978	**Animal Months**	2128
Capable Range	7978	**Acres per animal month**	3.7
Permitted Use	266 cow/calf; 10/16-6/15	**Projected Use**	266 cow/calf; 10/16-4/30
		Utilization Level	50% max utilization
Major Drainage	Bruno Canyon	**Elevation**	5200 to 6900 feet
Major Vegetation type	chaparral		
Type of grazing system	4 pasture deferred rotation		
Planned Improvements	- Mesquite Control (20 acres)		
Allotment Condition	- The overall trend of the allotment is upward. 60% of the allotment is in moderately low range condition with an upward trend and 40% is moderately low with a static trend. - 30% of the allotment is in satisfactory soil condition and 70% is in unsatisfactory soil condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Cienega	**Allotment Number**	108
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2646	**Animal Months**	300
Capable Range	1519	**Acres per animal month**	5.1
Permitted Use	50 cow/calf; 1/1-4/30	**Projected Use**	50 cow/calf; 1/1-4/30
		Utilization Level	50% max utilization
Major Drainage	None	**Elevation**	4800 to 8500 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	- Reconstruction of National Forest Boundary Fence - Clean out dams by hand		
Allotment Condition	- The overall trend of the allotment is static. Half of the allotment is in moderately high range condition with a static trend and half is in moderately low condition with a static trend. - 40% of the allotment is in satisfactory soil condition, 50% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Cochise Head	**Allotment Number**	150
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon Creek
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7378	**Animal Months**	756
Capable Range	5592	**Acres per animal month**	7.4
Permitted Use	126 cow/calf; 11/1-4/30	**Projected Use**	126 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Brushy, Keating, Oak Canyons	**Elevation**	5000 to 8109 feet
Major Vegetation type	coniferous woodland		
Type of grazing system	2 pasture season long		
Planned Improvements	- Reconstruct two springs		
Allotment Condition	- The overall trend of the allotment is static. 80% of the allotment is in moderately high range condition with a static trend and 20% is moderately low with an upward trend. - 75% of the allotment is in satisfactory soil condition and 25% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of known roost site. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	East Whitetail	**Allotment Number**	149
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon Creek
Allotment Acres		**Projected Stocking Rate**	
Total Acres	10962	**Animal Months**	1200

Capable Range	4684	**Acres per animal month**	3.9
Permitted Use	200 cow/calf; 11/15-5/15	**Projected Use**	200 cow/calf; 11/15-5/15
		Utilization Level	45% max utilization
Major Drainage	East Whitetail, Indian Creek & Jhus Canyon	**Elevation**	4800 to 8100 feet
Major Vegetation type	coniferous woodland		
Type of grazing system	7 pasture rotation		
Planned Improvements	- 1/8 mile drift fence in E. Whitetail above private land - Develop two springs on the allotment		
Allotment Condition	- The overall trend of the allotment is upward. 25% of the allotment is in moderately high range condition with a stable trend, 60% is moderately low with an upward trend and 15% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition, 25% is unsatisfactory and 25% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of known roost site. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Horseshoe	**Allotment Number**	118
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	18864	**Animal Months**	1500
Capable Range	9087	**Acres per animal month**	6.1
Permitted Use	250 cow/calf; 11/1-4/30	**Projected Use**	250 cow/calf; 11/1-4/30
		Utilization Level	45% max utilization
Major Drainage	Horseshoe Canyon, Pot Hole & Blevins Draw	**Elevation**	4500 to 8200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pasture rotation		
Planned Improvements	- Construct drift fence on south side of Horseshoe Canyon above the Roush Place and still east of Horseshoe Tank		
Allotment Condition	- The overall trend of the allotment is upward. 10% of the allotment is in moderately high range condition with an upward trend, 70% is moderately low with an upward trend and 20% is moderately low with a static trend. - 35% of the allotment is in satisfactory soil condition, 25% is unsatisfactory and 40% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Hunt Canyon	**Allotment Number**	123

5th Code Watershed	San Simon Creek & White Water Draw	**4th Code Watershed**	San Simon Creek & White Water Draw
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8462	**Animal Months**	2340
Capable Range	8369	**Acres per animal month**	3.6
Permitted Use	195 cow/calf; 3/1-2/28	**Projected Use**	195 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Hunt, South Bruno, High Lonesome, Rustler Canyons	**Elevation**	5500 to 6500 feet
Major Vegetation type	broadleaf woodland; coniferous woodland		
Type of grazing system	5 pasture deferred rotation		
Planned Improvements	- Pipeline extension - Watershed Structures (Loose rock check dams)		
Allotment Condition	- The overall trend of the allotment is downward. 45% of the allotment is in moderately low range condition with a static trend and 55% is moderately low with a downward trend. - 70% of the allotment is in satisfactory soil condition and 30% is in impaired condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Jackwood	**Allotment Number**	119
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	10832	**Animal Months**	2436
Capable Range	10832	**Acres per animal month**	4.4
Permitted Use	812 cow/calf; 12/1-5/31	**Projected Use**	812 cow/calf; 12/1-5/31
		Utilization Level	45% max utilization
Major Drainage	Jackwood Canyon	**Elevation**	4300 to 6300 feet
Major Vegetation type	desert grassland		
Type of grazing system	2 pasture on/off		
Planned Improvements	- Watershed/Range Project restoring 5 dams		
Allotment Condition	- The overall trend of the allotment is static. 10% of the allotment is in moderately high range condition with an upward trend and 90% is moderately high with a static trend. - 10% of the allotment is in satisfactory soil condition and 90% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Lower Rock Creek	**Allotment Number**	103
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7890	**Animal Months**	300
Capable Range	5541	**Acres per animal month**	18.5

Permitted Use	75 cow/calf; 7/1-10/31	**Projected Use**	75 cow/calf; 7/1-10/31
		Utilization Level	45% max utilization
Major Drainage	Rock, Witch, Fife Canyons & Five Mile Creek	**Elevation**	6000 to 7000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	2 pasture rest rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend of the allotment is upward. 90% of the allotment is in high range condition with an upward trend and 10% is moderately high with an upward trend. - 90% of the allotment is in satisfactory soil condition with 10% in unsatisfactory condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE = bald eagle) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Lower Rucker	**Allotment Number**	115
5th Code Watershed	Whitewater Draw	**4th Code Watershed**	Whitewater Draw
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4730	**Animal Months**	1360
Capable Range	4730	**Acres per animal month**	3.5
Permitted Use	150 cow/calf; 11/16-7/15 20 cow/calf; 11/16-7/15; private land permit	**Projected Use**	150 cow/calf 11/16-7/15; 20 cow/calf 11/16-7/15; private land permit
		Utilization Level	45% max utilization
Major Drainage	Rucker & O'Keefe Canyons	**Elevation**	5500 to 6800 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	- Reconstruct O'Keefe Spring - Reconstruct Pasture fence - Reconstruct Allotment boundary fence		
Allotment Condition	- The overall trend of the allotment is static. 5% f the allotment is in moderately high range condition with an upward trend, 75% is moderately high with a static trend and 20% is moderately low with a static trend. - 70% of the allotment is in satisfactory soil condition and 30% is unsatisfactory		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Pedragosa	**Allotment Number**	125
5th Code Watershed	San Bernardino Valley	**4th Code Watershed**	San Bernardino Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	10035	**Animal Months**	2352
Capable Range	9966	**Acres per animal month**	4.2
Permitted Use	196 cow/calf; 3/1-2/28 4 horses; 3/1-2/28	**Projected Use**	196 cow/calf; 3/1-2/28 4 horses; 3/1-2/28

		Utilization Level	45% utilization during growing season, 50% utilization during dormant season
Major Drainage	Indian Creek, Buck Creek & High Lonesome	**Elevation**	5000 to 6500 feet
Major Vegetation type	desert grassland		
Type of grazing system	4 pasture deferred rotation		
Planned Improvements	- Water well with pipeline - Reconstruct boundary fence		
Allotment Condition	- The overall trend of the allotment is static. 5% of the allotment is in moderately high range condition with an upward trend, 15% is moderately high with a static trend and 80% is moderately low with a static trend. - 10% of the allotment is in satisfactory soil condition and 90% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Pine	**Allotment Number**	104
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	9498	**Animal Months**	50
Capable Range	6772	**Acres per animal month**	135.4
Permitted Use	20 cow/calf; 3/1-2/28	**Projected Use**	34 cow/calf; 7/15-8/31
		Utilization Level	45% max utilization
Major Drainage	Fife, Hoovey & Green Canyons	**Elevation**	5300 to 7500 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	2 pasture season long		
Planned Improvements	- Reconstruct allotment boundary fences.		
Allotment Condition	- The overall trend of the allotment is static. 10% of the allotment is in moderately low range condition with an upward trend and 90% is moderately low with a static trend. - 2/3 of the allotment is in satisfactory soil condition and 1/3 is in impaired condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of known roost site. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Price Canyon	**Allotment Number**	117
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	14016	**Animal Months**	2280
Capable Range	11596	**Acres per animal month**	4.9
Permitted Use	190 cow/calf; 3/1-2/28 9 horses; 3/1-2/28	**Projected Use**	190 cow/calf; 3/1-2/28 9 horses; 3/1-2/28
		Utilization Level	45% max utilization

Major Drainage	Jackwood, Brushy & Baker Canyons	**Elevation**	5000 to 9000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	12 pasture deferred rotation		
Planned Improvements	- Reconstruction of boundary fence - Reconstruction of internal fence		
Allotment Condition	- The overall trend of the allotment is upward. All of the allotment is in moderately low range condition with an upward trend. - 50% of the allotment is in satisfactory condition, 40% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	RAK/Pridham/Stanford	**Allotment Number**	114
5th Code Watershed	Whitewater Draw	**4th Code Watershed**	Whitewater Draw
Allotment Acres **Total Acres** **Capable Range**	 36324 21307	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 3750 5.7
Permitted Use	224 cow/calf, 11/1-4/30; 238 cow/calf, 3/1-2/28; 54 cow/calf, 9/5-5/31; 2 cow/calf, 2/1-5/31; 2 cow/calf, 9/1-10/31	**Projected Use**	400 cow/calf; 8/1-4/30 25 bulls; 11/1-4/30
		Utilization Level	45% max utilization
Major Drainage	John Long & Rucker Canyon	**Elevation**	5600 to 9350 feet
Major Vegetation type	broadleaf woodland; coniferous woodland		
Type of grazing system	14 pasture rest rotation		
Planned Improvements	- Earthen dam (2 each) - Replace storage tank		
Allotment Condition	- The overall trend of the allotment is static. 20% of the allotment is in moderately high range condition with an upward trend, 30% is moderately low with an upward trend and 50% is moderately low with a static trend. - 65% of allotment is in satisfactory soil condition, 20% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Rough Mountain	**Allotment Number**	146
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon Creek
Allotment Acres **Total Acres** **Capable Range**	 17885 8838	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 2106 4.2

Permitted Use	295 cow/calf 11/1-4/30; 56 cow/calf 11/1-4/30; private land permit	**Projected Use**	295 cow/calf 11/1-4/30; 56 cow/calf 11/1-4/30; private land permit
		Utilization Level	45% max utilization
Major Drainage	Emigrant, Little Wood, Wood, & Fox Canyon	**Elevation**	4600 to 8000 feet
Major Vegetation type	broadleaf woodland; chaparral		
Type of grazing system	CRMP with state, NF, BLM and private land		
Planned Improvements	- Redevelop Little Wood Spring, Brad Spring, Maverick Spring, Upper Cherry Spring Seep. - Reconstruct Interior and boundary fences.		
Allotment Condition	- The overall trend of the allotment is static. Half of the allotment is in moderately high range condition with an upward trend and half is moderately low with a static trend. - 40% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 30% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves during the first 2 weeks of the time when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Sanders	**Allotment Number**	145
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	353	**Animal Months**	96
Capable Range	353	**Acres per animal month**	3.7
Permitted Use	32 cow/calf; 1/1-3/31	**Projected Use**	32 cow/calf; 1/1-3/31
		Utilization Level	50% max utilization
Major Drainage	None	**Elevation**	5600 feet
Major Vegetation type	desert grassland		
Type of grazing system	1 pasture season long		
Planned Improvements	- Earthen dam - Reconstruct boundary fence		
Allotment Condition	- The overall trend of the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 5% of the allotment is in satisfactory soil condition and 95% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Sanford	**Allotment Number**	109
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1085	**Animal Months**	192
Capable Range	562	**Acres per animal month**	2.9
Permitted Use	12 cow/calf; 3/1-2/28	**Projected Use**	16 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization

Major Drainage	No major ones	**Elevation**	4800 to 7200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture on/off		
Planned Improvements	- Reconstruct Forest Boundary fence in Sanford and Sulphur Draw		
Allotment Condition	- The overall trend of the allotment is upward. 20% of the allotment is in moderately high range condition with a static trend and 80% is in moderately low condition with an upward trend. - Half of the allotment is in satisfactory soil condition and half is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Sulphur Draw	**Allotment Number**	110
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5636	**Animal Months**	432
Capable Range	2410	**Acres per animal month**	5.6
Permitted Use	72 cow/calf; 11/1-4/30	**Projected Use**	72 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Sulphur Draw Canyon	**Elevation**	4800 to 8100 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	- Reconstruct Forest Boundary fence in Sanford and Sulphur Draw - Replace storage tank at Sulphur Spring		
Allotment Condition	- The overall trend of the allotment is upward. 85% of the allotment is in moderately low range condition with an upward trend and 15% is moderately low with a static trend. - 40% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 40% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Turkey Creek	**Allotment Number**	106
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	13817	**Animal Months**	867
Capable Range	3380	**Acres per animal month**	3.9
Permitted Use	66 cow/calf; 3/1-2/28 25 cows; 9/15-12/15	**Projected Use**	66 cow/calf; 3/1-2/28 25 cows; 9/15-12/15
		Utilization Level	45% max utilization
Major Drainage	Turkey Creek, Turkey Pen, Coal Pit Mormon & Saulsbury Canyons,	**Elevation**	5400 to 9600 feet
Major Vegetation type	broadleaf woodland; coniferous forest		

Type of grazing system	4 pasture Best Pasture system
Planned Improvements	- Umbrella trick tank - Develop Mormon Spring
Allotment Condition	- The overall trend of the allotment is upward. 5% of the allotment is in moderately high range condition with an upward, 20% is moderately high with a static trend and 75% is moderately low with an upward trend. - Almost all of the allotment is in satisfactory soil condition with a small amount in unsatisfactory and unsuited condition.
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs on the allotment as does chub (YAC = Yaqui chub) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)

Allotment Name	West Whitetail	**Allotment Number**	148
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3777	**Animal Months**	450
Capable Range	3194	**Acres per animal month**	7.1
Permitted Use	72 cow/calf; 11/1-4/30	**Projected Use**	36 cow/calf; 11/1-2/15 36 cow/calf; 4/15-7/15 36 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	West Whitetail	**Elevation**	5600 to 7800 feet
Major Vegetation type	broadleaf woodland; coniferous woodland		
Type of grazing system	4 pasture		
Planned Improvements	- Replace trick tank apron		
Allotment Condition	- The overall trend of the allotment is static. 5% of the allotment is in moderately high range condition with an upward trend, 35% is moderately high with a static trend and 60% is moderately low with a static trend. - 70% of the allotment is in satisfactory soil condition and 30% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Chiricahua EMA - short term

Allotment Name	Willie Rose	**Allotment Number**	147
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon Creek
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1572	**Animal Months**	93
Capable Range	565	**Acres per animal month**	3.0
Permitted Use	31 cow/calf; 11/1-5/15	**Projected Use**	62 cow/calf 11/15-12/31; 62 cow/calf; 3/1-4/15
		Utilization Level	50% max utilization
Major Drainage	Triangle Canyon	**Elevation**	4650 to 7200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		

Planned Improvements	- Storage and pipeline from Spring - Hand grub juniper seedlings
Allotment Condition	- The overall trend of the allotment is upward. All of the allotment is in moderately low range condition with an upward trend. - 65% of the allotment is in satisfactory soil condition and 35% is unsatisfactory.
Management Actions that contribute to effects	**LAA** - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)

Douglas Ranger District — Dragoon EMA - short term

Allotment Name	Black Diamond	**Allotment Number**	159
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1586	**Animal Months**	384
Capable Range	1303	**Acres per animal month**	3.4
Permitted Use	25 cow/calf; 3/1-2/28 7 cow/calf; 3/1-2/28; pvt	**Projected Use**	25 cow/calf; 3/1-2/28 7 cow/calf; 3/1-2/28;pvt
		Utilization Level	45% utilization during growing season, 50% utilization during dormant season
Major Drainage	None	**Elevation**	4800 to 7150 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	- Forest Boundary Fence (2.0 miles) - Cattleguard		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately high range condition with a downward trend. - 60% of the allotment is in satisfactory soil condition, 10% is impaired and 30% is unsuited (1999).		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District — Dragoon EMA - short term

Allotment Name	Granite Springs	**Allotment Number**	155
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7173	**Animal Months**	1404 cow/calf 36 horses
Capable Range	4911	**Acres per animal month**	3.4
Permitted Use	117 cow/calf; 3/1-2/28 3 horses; 3/1-2/28	**Projected Use**	180 cow/calf; 3/1-2/28 3 horses; 3/1-2/28
		Utilization Level	45% utilization during growing season, 50% utilization during dormant season
Major Drainage	None	**Elevation**	4000 to 7100 feet

Major Vegetation type	desert grassland; broadleaf woodland; coniferous woodland
Type of grazing system	7 pasture deferred rotation with state and private land
Planned Improvements	- Umbrella trick tank
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 30% of the allotment is in satisfactory soil condition, 60% is unsatisfactory and 10% is unsuited.
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)

Allotment Name	Halfmoon	**Allotment Number**	156
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7566	**Animal Months**	1200
Capable Range	3801	**Acres per animal month**	3.2
Permitted Use	100 cow/calf; 3/1-2/28	**Projected Use**	100 cow/calf; 3/1-2/28
		Utilization Level	45% utilization during growing season, 50% utilization during dormant season
Major Drainage	none	**Elevation**	5000 to 7500 feet
Major Vegetation type	desert grassland; coniferous woodland		
Type of grazing system	4 pasture rest rotation		
Planned Improvements	- Cattleguards (2 each) - Hillside Spring Development		
Allotment Condition	- The overall trend for the allotment is static. Half of the allotment is in moderately high range condition with a static trend and half is moderately low with an upward trend. - 20% of the allotment is in satisfactory soil condition, 60% is unsatisfactory and 20% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Dragoon EMA - short term

Allotment Name	Noonan	**Allotment Number**	157
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5446	**Animal Months**	1536
Capable Range	2899	**Acres per animal month**	1.9
Permitted Use	256 cow/calf; 11/16-5/15	**Projected Use**	256 cow/calf; 11/16-5/15
		Utilization Level	50% max utilization
Major Drainage	Noonan & Grapevine	**Elevation**	4500 to 6000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	10 pasture deferred rotation		

Planned Improvements	- Develop seep in Middle Pasture
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 40% of the allotment is in satisfactory soil condition and 60% is unsatisfactory.
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)

Allotment Name	Reppy	**Allotment Number**	160
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres **Total Acres** **Capable Range**	 2792 1473	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 480 3.1
Permitted Use	60 cow/calf; 3/1-2/28	**Projected Use**	60 cow/calf; 3/1-2/28
		Utilization Level	45% utilization during growing season, 55% utilization during dormant season
Major Drainage	Henry Canyon	**Elevation**	5200 to 7000 feet
Major Vegetation type	desert grassland		
Type of grazing system	1 pasture on/off with state and private land		
Planned Improvements	None		
Allotment Condition	The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. 5% of the allotment is in satisfactory soil condition, 70% is unsatisfactory and 25% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District | Dragoon EMA - short term

Allotment Name	Slavin	**Allotment Number**	154
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	11616	**Animal Months**	780
Capable Range	5017	**Acres per animal month**	6.4
Permitted Use	130 cow/calf; 12/1-5/31	**Projected Use**	130 cow/calf; 12/1-5/31
		Utilization Level	50% max utilization
Major Drainage	West Stronghold Canyon & Slavin Canyon	**Elevation**	4800 to 7000 feet
Major Vegetation type	coniferous woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	- Well with windmill		
Allotment Condition	- The overall trend for the allotment is static. 15% of the allotment is in moderately high range condition with an upward trend, 65% is moderately high with a static trend and 20% is moderately low with a static trend. - 45% of the allotment is in satisfactory soil condition, 45% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Walnut Springs	**Allotment Number**	161
5th Code Watershed	Willcox Playa	**6th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2787	**Animal Months**	912
Capable Range	2101	**Acres per animal month**	2.3
Permitted Use	76 cow/calf; 3/1-2/28	**Projected Use**	76 cow/calf; 3/1-2/28
		Utilization Level	45% utilization during growing season, 55% utilization during dormant season
Major Drainage	none	**Elevation**	5000 to 6800 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	- Watershed Structure (Dikes)		
Allotment Condition	- The overall trend for the allotment is static. 40% of the allotment is in high range condition with an upward trend, 10% is high with a static trend, 45% is moderately high with a static trend and 5% is moderately low with a static trend. - 25% of the allotment is in satisfactory soil condition and 75% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District — Peloncillo EMA - short term

Allotment Name	Clanton/Cloverdale	**Allotment Number**	137
5th Code Watershed	Cloverdale Creek/Animas Creek	**4th Code Watershed**	Cloverdale/Animas Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	14913	**Animal Months**	3648
Capable Range	14356	**Acres per animal month**	3.9
Permitted Use	300 cow/calf; 3/1-2/28 4 horses; 3/1-2/28	**Projected Use**	300 cow/calf; 3/1-2/28 4 horses; 3/1-2/28
		Utilization Level	45% utilization during growing season, 50% utilization during dormant season
Major Drainage	Cloverdale Creek	**Elevation**	5200 to 6200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	7 pasture deferred rotation		
Planned Improvements	- Extend pipeline to Rock Tank - Pasture fence - Mesquite control (500 acres) - Reconstruct allotment boundary fence - Reconstruct exclosure fence - Erosion control and stabilization		
Allotment Condition	- The overall trend for the allotment is upward. 65% of the allotment is in moderately high range condition with an upward trend and 35% is moderately high with a static trend. - 45% of the allotment is in satisfactory soil condition and 55% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB = Mexican long-nosed bat) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR = New Mexico ridge-nosed rattlesnake) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF = northern aplomado falcon) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District | Peloncillo EMA - short term

Allotment Name	Deer Creek	**Allotment Number**	129
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres **Total Acres** **Capable Range**	 5425 5007	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1656 3.0
Permitted Use	276 cow/calf; 11/1-4/30	**Projected Use**	276 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Owl, North Deer, South Deer, Middle Deer Creeks	**Elevation**	4500 to 6300 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	5 pasture deferred rotation		
Planned Improvements	- Two earth dams - Half mile of Forest Boundary Fence		
Allotment Condition	- The overall trend for the allotment is upward. 80% of the allotment is in moderately high range condition with an upward trend, 10% is moderately high with a static trend and 15% is moderately low with a static trend. - 2/3 of the allotment is in satisfactory soil condition and 1/3 is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Fairchild	**Allotment Number**	134
5th Code Watershed	San Simon Creek/ San Bernardino Valley	**4th Code Watershed**	San Simon Creek/ San Bernardino Valley
Allotment Acres **Total Acres** **Capable Range**	 3939 3608	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 506 7.1
Permitted Use	92 cow/calf; 10/1-3/15	**Projected Use**	92 cow/calf; 10/1-3/15
		Utilization Level	50% max utilization
Major Drainage	South Fork Skeleton Canyon	**Elevation**	2500 to 6200 feet
Major Vegetation type	broadleaf woodland; coniferous woodland		
Type of grazing system	season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 70% of the allotment is in moderately high range condition with an upward trend and 30% is moderately high with a static trend. - 85% of the allotment is in satisfactory soil condition and 15% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Geronimo	**Allotment Number**	138
5th Code Watershed	San Bernardino Valley	**4th Code Watershed**	San Bernardino Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8105	**Animal Months**	1088
Capable Range	7345	**Acres per animal month**	6.8
Permitted Use	177 cow/calf 11/16-4/30; 21 cow/calf 11/16-4/30; private land permit	**Projected Use**	177 cow/calf 11/16-4/30; 21 cow/calf 11/16-4/30; private land permit
		Utilization Level	50% max utilization
Major Drainage	Cottonwood, Estes, Sycamore Canyons	**Elevation**	4700 to 6000 feet
Major Vegetation type	coniferous woodland		
Type of grazing system	3 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 70% of the allotment is in moderately high range condition with an upward trend and 30% is moderately high with a static trend. - 45% of the allotment is in satisfactory soil condition and 55% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Graves	**Allotment Number**	133
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	709	**Animal Months**	168 cow/calf
Capable Range	709	**Acres per animal month**	4.2
Permitted Use	14 cow/calf; 3/1-2/28	**Projected Use**	14 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Starvation Canyon	**Elevation**	5200 to 6000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 40% of the allotment is in moderately high range condition with an upward trend and 60% is in moderately low condition with a static trend. - 75% of the allotment is in satisfactory soil condition and 25% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Guadalupe	**Allotment Number**	143
5th Code Watershed	San Bernardino Valley	**4th Code Watershed**	San Bernardino Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7266	**Animal Months**	1800
Capable Range	6703	**Acres per animal month**	3.7
Permitted Use	150 cow/calf; 3/1-2/28	**Projected Use**	150 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Guadalupe & Baker Canyons	**Elevation**	4300 to 6250 feet
Major Vegetation type	desert grassland		
Type of grazing system	6 pasture CRMP with BLM		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 70% of the allotment is in moderately high range condition with an upward trend, 20% is moderately high with a static trend and half is moderately low with an upward trend. - 60% of the allotment is in satisfactory condition and 40% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45% (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Juniper Basin	**Allotment Number**	130
5th Code Watershed	Animas Creek	**4th Code Watershed**	Animas Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2671	**Animal Months**	750
Capable Range	2554	**Acres per animal month**	3.4
Permitted Use	125 cow/calf; 11/1-4/30	**Projected Use**	125 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Horse Camp Draw & Juniper Basin Draw	**Elevation**	5500 to 6300 feet
Major Vegetation type	desert grassland		
Type of grazing system	3 pasture season long		
Planned Improvements	- Pepi Tank: Add water storage and trough - Miller Tank: Raise dam - South Pasture: Construct 10,000 gallon trick tank		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 10% of the allotment is in satisfactory soil condition and 90% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District

Peloncillo EMA - short term

Allotment Name	Maverick	**Allotment Number**	136
5th Code Watershed	San Bernardino Valley/ Animas Creek/Cloverdale Creek	**4th Code Watershed**	San Bernardino Valley/ Animas Creek/Cloverdale Creek

Allotment Acres		**Projected Stocking Rate**	
Total Acres	11416	**Animal Months**	2292
Capable Range	11038	**Acres per animal month**	4.8
Permitted Use	184 cow/calf 11/20-2/15; 7 horses 3/1-2/28; private land permit	**Projected Use**	278 cow/calf 11/20-2/15; 7 horses 3/1-2/28; private land permit
		Utilization Level	50% max utilization
Major Drainage	Clanton Draw, Miller Creek, Lion Creek, Cloverdale, & Guadalupe Canyons	**Elevation**	5400 to 6250 feet
Major Vegetation type	coniferous woodland		
Type of grazing system	5 pasture season long		
Planned Improvements	- Watershed Project Gully Control		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 70% of the allotment is in satisfactory soil condition and 30% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Outlaw Mountain	**Allotment Number**	135
5th Code Watershed	San Bernardino Valley	**4th Code Watershed**	San Bernardino Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2178	**Animal Months**	396
Capable Range	1989	**Acres per animal month**	5.0
Permitted Use	33 cow/calf; 3/1-2/28	**Projected Use**	33 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Hog & Cottonwood Canyons	**Elevation**	5000 to 6100 feet
Major Vegetation type	desert grassland; coniferous woodland		
Type of grazing system	1 pasture season long with state land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in high range condition with an upward trend, 30% is high with a static trend, 5% is moderately high with an upward trend and 45% is moderately high with a static trend. - 40% of allotment in satisfactory soil condition, 55% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Robertson	**Allotment Number**	144
5th Code Watershed	Cloverdale Creek	**4th Code Watershed**	Cloverdale
Allotment Acres **Total Acres** **Capable Range**	 9792 9267	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 2220 4.2
Permitted Use	143 cow/calf; 3/1-2/28 42 yearlings; 3/1-2/28	**Projected Use**	143 cow/calf; 3/1-2/28 42 yearlings; 3/1-2/28
		Utilization Level	45% utilization during growing season, 50% utilization during dormant season
Major Drainage	Cloverdale Creek	**Elevation**	5250 to 6200 feet
Major Vegetation type	desert grassland		
Type of grazing system	6 pasture, best pasture system		
Planned Improvements	- Pipeline into South Cloverdale Pasture (1 mile) - Extend existing pipeline from Gammy pasture into Bud trap (1/4 mile) - Extend Black Point Pipeline in Cloverdale Allotment onto the Robertson Allotment		
Allotment Condition	- The overall trend for the allotment is static. 5% of allotment is in moderately high range condition with an upward trend, 40% is moderately high with static trend, 20% is moderately low with a static trend, 35% is moderately low with a downward trend. - 82% of allotment in satisfactory soil condition, 7% unsatisfactory and 11% is unsuited (1999).		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when they produce flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Douglas Ranger District — Peloncillo EMA - short term

Allotment Name	Skeleton Canyon	**Allotment Number**	131
5th Code Watershed	San Simon Creek	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4651	**Animal Months**	990
Capable Range	4365	**Acres per animal month**	4.4
Permitted Use	180 cow/calf; 10/1-3/15	**Projected Use**	180 cow/calf; 10/1-3/15
		Utilization Level	50% max utilization
Major Drainage	Skeleton Canyon	**Elevation**	2500 to 6300 feet
Major Vegetation type	desert grassland		
Type of grazing system	season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 15% of allotment is in satisfactory soil condition, 75% is unsatisfactory, 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when they produce flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs with MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Nogales Ranger District — Santa Rita EMA - short term

Allotment Name	Temporal	**Allotment Number**	250
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	21589	**Animal Months**	3600
Capable Range	14872	**Acres per animal month**	4.1
Permitted Use	350 cow/calf; 3/1-2/28	**Projected Use**	300 cow/calf; 3/1-2/28
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Temporal Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	7 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 10% of the allotment is in high range condition with a static trend, 80% is moderately high with a static trend and 10% is moderately low with a static trend. - 65% of the allotment in satisfactory soil condition, 15% unsatisfactory and 20% unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Nogales Ranger District — Tumacacori EMA - short term

Allotment Name	Carrizo	**Allotment Number**	205
5th Code Watershed	Altar Valley/Rio Altar	**4th Code Watershed**	Brawley/Rio Altar
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3609	**Animal Months**	900
Capable Range	3267	**Acres per animal month**	3.6
Permitted Use	105 cow/calf; 3/1-2/28	**Projected Use**	75 cow/calf; 3/1-2/28
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Yellow Jacket Wash	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	4 pasture deferred rotation		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 55% of the allotment is in satisfactory soil condition and 45% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when they produce flower stalks. (LNB) - Livestock grazing occurs in what is thought to be suitable habitat at levels in excess of 30%. (CFP = cactus ferruginous pygmy-owl) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Cross S	**Allotment Number**	204
5th Code Watershed	Rio Altar	**4th Code Watershed**	Rio Altar
Allotment Acres		**Projected Stocking Rate**	
Total Acres	18397	**Animal Months**	5400
Capable Range	18120	**Acres per animal month**	3.4
Permitted Use	450 cow/calf; 3/1-2/28	**Projected Use**	450 cow/calf; 3/1-2/28
		Utilization Level	35% utilization during growing season, 55% utilization in dormant season
Major Drainage	Tres Bellotas Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pasture deferred rotation		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 90% of the allotment is in satisfactory soil condition and 10% is impaired (1999).		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when they produce flower stalks. (LNB) - Utilization exceeds 45%. (LNB) - Livestock grazing occurs in what may be suitable habitat in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs in potential habitat. (MAB) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Nogales Ranger District — Tumacacori EMA - short term

Allotment Name	Fresnal	**Allotment Number**	203
5th Code Watershed	Altar Valley/Rio Altar	**4th Code Watershed**	Brawley/Rio Altar

Allotment Acres		**Projected Stocking Rate**	
Total Acres	13020	**Animal Months**	3360
Capable Range	12118	**Acres per animal month**	3.6
Permitted Use	280 cow/calf; 3/1-2/28	**Projected Use**	280 cow/calf; 3/1-2/28
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Fresnal Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	5 pasture deferred rotation		
Planned improvements	None		
Allotment Condition	- Overall trend is static. All of allotment is in moderately high range condition with static trend. - 57% of the allotment is in satisfactory soil condition and 43% is impaired (1999).		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas with agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what may be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs in potential habitat. (MAB = masked bob white quail) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Jarillas	**Allotment Number**	202
5th Code Watershed	Altar Valley/Rio Altar	**4th Code Watershed**	Brawley/Rio Altar
Allotment Acres		**Projected Stocking Rate**	
Total Acres	12485	**Animal Months**	3240
Capable Range	12485	**Acres per animal month**	3.9
Permitted Use	270 cow/calf; 3/1-2/28	**Projected Use**	270 cow/calf; 3/1-2/28
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	San Luis Wash	**Elevation**	
Major Vegetation type	desert grassland		
Type of grazing system	8 pasture deferred rotation		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 90% of the allotment is in high range condition with a static trend and 10% is moderately high with a static trend. - 96% of the allotment is in satisfactory soil condition and 4% is impaired (1999).		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs in potential habitat. (MAB) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Nogales Ranger District

Tumacacori EMA - short term

Allotment Name	Oro Blanco	**Allotment Number**	206
5th Code Watershed	Altar Valley/Rio Altar	**4th Code Watershed**	Brawley/Rio Altar

Allotment Acres		**Projected Stocking Rate**	
Total Acres	3181	**Animal Months**	1032
Capable Range	2903	**Acres per animal month**	2.8
Permitted Use	123 cow/calf; 3/1-2/28	**Projected Use**	86 cow/calf; 3/1-2/28
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Oro Blanco Wash	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	5 pasture deferred rotation		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 60% of the allotment is in moderately high range condition with an upward trend and 40% is moderately high with a static trend. - 75% of allotment is in satisfactory soil condition, 10% is impaired and 15% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Sardina	**Allotment Number**	209
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	12069	**Animal Months**	4080
Capable Range	10757	**Acres per animal month**	2.6
Permitted Use	340 cow/calf; 3/1-2/28	**Projected Use**	350 cow/calf; 11/16-8/15
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Jalisco, Apache, E. Fork Apache Canyon	**Elevation**	
Major Vegetation type	desert grassland		
Type of grazing system	4 pasture winter and spring use		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 93% of the allotment is in satisfactory soil condition and 7% is impaired (1999).		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Sierra Vista Ranger District

Huachuca EMA - short term

Allotment Name	Alisos/Sierra Tordilla	**Allotment Number**	353/341
5th Code Watershed	Middle Santa Cruz	**4th Code Watershed**	Upper Santa Cruz

Allotment Acres		**Projected Stocking Rate**	
Total Acres	11366	**Animal Months**	4272
Capable Range	9914	**Acres per animal month**	2.3
Permitted Use	352 cow/calf; 3/1-2/28	**Projected Use**	356 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Sycamore Canyon	**Elevation**	3800 to 7200 feet
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	7 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 55% of the allotment is in moderately high range condition with a static trend, 30% is moderately low with a static trend and 15% is low with a static trend. - Half of the allotment is in satisfactory soil condition and half is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in compliance with Biological Opinion issued in 1995. (PPC = Pima pineapple cactus)		

Allotment Name	Bender	**Allotment Number**	333
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3180	**Animal Months**	28
Capable Range	1798	**Acres per animal month**	64.1
Permitted Use	14 cow/calf; 10/1-3/31	**Projected Use**	14 cow/calf; 10/1-3/31
		Utilization Level	45% max utilization
Major Drainage	Harshaw Creek	**Elevation**	5100 to 6600 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 95% of the allotment is in moderately high range condition with a static trend and 5% is moderately low with an upward trend. - 90% of the allotment is in satisfactory soil condition, 5% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock use tanks with salamanders or within the range of the salamander. (STS) **NLAA** - Livestock grazing occurs on the allotment but not during the agave bolting and flowering season. (LNB) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Sierra Vista Ranger District

Huachuca EMA - short term

Allotment Name	Blacktail	**Allotment Number**	307
5th Code Watershed	Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3809	**Animal Months**	1613
Capable Range	3809	**Acres per animal month**	2.4

Permitted Use	100 cow/calf 3/1-2/28; 30 cow/calf 3/1-2/28; private land permit 3 horses 3/1-2/28; private land permit	**Projected Use**	100 cow/calf 3/1-2/28; 30 cow/calf 3/1-2/28; private land permit 3 horses 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Sunnyside Canyon	**Elevation**	5200 to 5450 feet
Major Vegetation type	plains grassland		
Type of grazing system	6 pasture deferred rotation with private land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 10% of the allotment is in satisfactory soil condition and 90% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock use tanks with salamanders or within the range of the salamander. (STS) **NLAA** - Livestock grazing occurs on the allotment but vegetation types do not support agaves or saguaros. (LNB) - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF = black-footed ferret) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Allotment Name	Campini	**Allotment Number**	309
5th Code Watershed	Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5653	**Animal Months**	2580
Capable Range	5653	**Acres per animal month**	2.2
Permitted Use	215 cow/calf; 3/1-2/28	**Projected Use**	215 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Sunnyside	**Elevation**	4900 to 5400 feet
Major Vegetation type	plains grassland		
Type of grazing system	5 pasture Best Pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 40% of the allotment is in satisfactory soil condition, 35% is impaired and 25% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock use tanks with salamanders or within the range of the salamander. (STS = Sonora tiger salamander) **NLAA** - Livestock grazing occurs on the allotment but vegetation types do not support agaves or saguaros. (LNB) - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Sierra Vista Ranger District

Huachuca EMA - short term

Allotment Name	Canelo	**Allotment Number**	310
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	

Total Acres	811	**Animal Months**	240
Capable Range	811	**Acres per animal month**	3.4
Permitted Use	34 cow/calf 12/1-3/31; 34 cow/calf 8/1-9/30; 6 cow/calf 12/1-3/31; private land permit 6 cow/calf 8/1-9/30; private land permit	**Projected Use**	34 cow/calf 12/1-3/31; 34 cow/calf 8/1-9/30; 6 cow/calf 12/1-3/31; private land permit 6 cow/calf 8/1-9/30; private land permit
		Utilization Level	45% max utilization
Major Drainage	Turkey Creek	**Elevation**	5000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	2 pasture deferred rotation with private land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 45% of the allotment is in satisfactory soil condition and 55% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB)		

Sierra Vista Ranger District — Huachuca EMA - short term

Allotment Name	Crittenden	**Allotment Number**	314
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	10083	**Animal Months**	1980
Capable Range	7207	**Acres per animal month**	3.6
Permitted Use	165 cow/calf; 3/1-2/28	**Projected Use**	165 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	None	**Elevation**	4400 to 5950 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pasture rest rotation with Seibold Allotment		
Planned Improvements	- Pipeline extension to Red Bear, west Corral canyon, upper Oak Grove, and Lampshire.		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 50% of the allotment is in satisfactory soil condition, 40% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs in potential habitat. (GIM = Gila topminnow)		

Allotment Name	Duquesne	**Allotment Number**	342
5th Code Watershed	Sonoita Creek & Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	13767	**Animal Months**	2640
Capable Range	12235	**Acres per animal month**	4.6
Permitted Use	210 cow/calf; 3/1-2/28 10 cow/calf;3/1-2/28; private land permit	**Projected Use**	210 cow/calf; 3/1-2/28 10 cow/c; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Harshaw, Mowry, Finley, Adams & Duquesne Canyons	**Elevation**	5000 to 7000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	13 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 55% of the allotment is in satisfactory soil condition and 45% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS)		

Sierra Vista Ranger District | Huachuca EMA - short term

Allotment Name	Farrell	**Allotment Number**	315
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6429	**Animal Months**	862
Capable Range	6117	**Acres per animal month**	7.1
Permitted Use	60 cow/calf 3/1-2/28; 11 cow/calf; 3/1-2/28; private land permit	**Projected Use**	60 cow/calf 3/1-2/28; 11 cow/c 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Harshaw	**Elevation**	4600 to 6200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately low range condition with a downward trend. - 65% of the allotment is in satisfactory soil condition and 35% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Harshaw	**Allotment Number**	319
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	9302	**Animal Months**	1676
Capable Range	6525	**Acres per animal month**	3.9
Permitted Use	262 yearlings; 3/1-2/28 2 cow/calf; 3/1-2/28	**Projected Use**	137 yearlings; 3/1-2/28 2 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Harshaw	**Elevation**	4400 to 6289 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 95% of the allotment is in satisfactory soil condition and 5% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock use tanks with salamanders or within range of salamander. (STS) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Sierra Vista Ranger District | Huachuca EMA - short term

Allotment Name	Hayfield	**Allotment Number**	345
5th Code Watershed	Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	9263	**Animal Months**	4014
Capable Range	9254	**Acres per animal month**	2.3
Permitted Use	286 cow/calf 3/1-2/28; 71 cow/calf 3/1-2/28; private land permit	**Projected Use**	263 cow/calf 3/1-2/28; 71 cow/calf 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Chino, Finley & Adams	**Elevation**	3900 to 5500 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 herd, 14 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 80% of the allotment is in moderately high range condition with a static trend and 20% is moderately low with a static trend. - 10% of the allotment is in satisfactory soil condition and 90% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS)		

Allotment Name	HQ	**Allotment Number**	321
5th Code Watershed	Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1518	**Animal Months**	744
Capable Range	1518	**Acres per animal month**	2.0
Permitted Use	45 cow/calf 3/1-2/28; 15 cow/calf 3/1-2/28; private land permit 2 horses 3/1-2/28; private land permit	**Projected Use**	45 cow/calf 3/1-2/28; 15 cow/calf 3/1-2/28; private land permit 2 horses 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Parker Canyon	**Elevation**	4700 to 5000 feet
Major Vegetation type	plains grassland		
Type of grazing system	2 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 80% of the allotment is in moderately high range condition with an upward trend and 20% is moderately high with a static trend. - 15% of the allotment is in satisfactory soil condition and 85% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock use tanks with salamanders or within the range of the salamander. (STS) **NLAA** - Livestock grazing occurs on the allotment but vegetation types do not support agaves or saguaros. (LNB) - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Sierra Vista Ranger District | Huachuca EMA - short term

Allotment Name	Joe's Spring	**Allotment Number**	322
5th Code Watershed	Upper San Pedro	**6th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	682	**Animal Months**	648
Capable Range	245	**Acres per animal month**	0.4
Permitted Use	54 cow/calf; 11/16-7/15	**Projected Use**	54 cow/calf; 11/16-7/15
		Utilization level	45% max utilization
Major Drainage	None	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	one pasture on/off with rest of allotment on Coronado National Monument		
Planned Improvements			
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 5% of the allotment is in satisfactory soil condition, 35% is unsatisfactory and 60% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB)		

Allotment Name	Kunde	**Allotment Number**	323
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4199	**Animal Months**	645
Capable Range	3300	**Acres per animal month**	5.1
Permitted Use	53 cow/calf; 3/1-2/28	**Projected Use**	53 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Redrock Canyon	**Elevation**	4400 to 5700 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	- 1.5 miles of pasture division fencing. - Construction of a trick tank (from Redrock Action Plan).		
Allotment Condition	- The overall trend for the allotment is static. 85% of the allotment is in moderately low range condition with a static trend and 15% is moderately low with a downward trend. - 55% of the allotment is in satisfactory soil condition, 40% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock grazing occurs in occupied and potential habitat. (GIM)		

Sierra Vista Ranger District | Huachuca EMA - short term

Allotment Name	Lewis	**Allotment Number**	325
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1060	**Animal Months**	268
Capable Range	713	**Acres per animal month**	2.7
Permitted Use	22 cow/calf; 3/1-2/28	**Projected Use**	22 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Harshaw Creek	**Elevation**	4200 to 6375 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture on/off		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. 25% of the allotment is in moderately low range condition with a static trend and 75% is low with a downward trend. - 76% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB)		

Allotment Name	Lochiel	**Allotment Number**	346
5th Code Watershed	Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2415	**Animal Months**	985
Capable Range	2202	**Acres per animal month**	2.2
Permitted Use	79 cow/calf; 3/1-2/28 2 cow/calf; 3/1-2/28; private land permit	**Projected Use**	79 cow/calf; 3/1-2/28 2 cow/calf; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	San Antonio Canyon	**Elevation**	4200 to 6200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation with private land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 70% of the allotment is in satisfactory soil condition and 30% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS)		

Sierra Vista Ranger District Huachuca EMA - short term

Allotment Name	Lyle Canyon	**Allotment Number**	327
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	11065	**Animal Months**	1217
Capable Range	8397	**Acres per animal month**	6.9
Permitted Use	50 cow/calf; 3/1-2/28 50 cow/calf; 3/1-2/28; temp	**Projected Use**	100 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Lyle Canyon	**Elevation**	4900 to 7900 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	7 pasture rest rotation		
Planned Improvements	- Water Protection Fund Projects: Construction of 2 fences, 1 pipeline, and drilling 2 wells.		
Allotment Condition	- The overall trend for the allotment is static. 60% of the allotment is in moderately high range condition with a static trend and 40% is moderately low with a static trend. - 30% of the allotment is in satisfactory soil condition, 50% is unsatisfactory and 20% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS)		

Allotment Name	MacFarland	**Allotment Number**	329
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1042	**Animal Months**	276
Capable Range	685	**Acres per animal month**	2.5
Permitted Use	20 cow/calf; 3/1-2/28 1 horse; 3/1-2/28; private land permit 2 cow/calf; 3/1-2/28; private land permit	**Projected Use**	20 cow/calf; 3/1-2/28 1 horse; 3/1-2/28; private land permit 2 cow/calf; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Harshaw Creek	**Elevation**	4600 to 5700 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately low range condition with a downward trend. - 95% of the allotment is in satisfactory soil condition and 5% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB)		

Sierra Vista Ranger District Huachuca EMA - short term

Allotment Name	Manila	**Allotment Number**	328
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres **Total Acres** **Capable Range**	 4488 4488	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1800 2.5
Permitted Use	125 cow/calf; 3/1-2/28 22 cow/calf; 3/1-2/28; private land permit 6 horses; 3/1-2/28; private land permit	**Projected Use**	125 cow/calf; 3/1-2/28 22 cow/calf; 3/1-2/28; private land permit 6 horses; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Lyle Canyon	**Elevation**	4800 to 6900 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture rotation		
Planned Improvements	- Constructing a fence to separate the endangered Huachuca Water Umbel from the rest of the Center Pasture. Would require 1.5 miles of fence and construction of an alternative water source.		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in moderately high range condition with a static trend, 35% is moderately low with a static trend and 40% is low with a static trend. - 25% of the allotment is in satisfactory soil condition and 75% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock grazing occurs in occupied habitat. (HWU= Huachuca water umbel) **NLAA** - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Allotment Name	Miller Canyon	**Allotment Number**	330
5th Code Watershed	Upper San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres **Total Acres** **Capable Range**	 4841 3715	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 174 21.4
Permitted Use	15 cow/calf; 3/1-2/28 7 cow/calf; 3/1-2/28; private land permit	**Projected Use**	15 cow/calf; 10/1-3/31 7 cow/calf; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Miller Canyon	**Elevation**	4800 to 9400 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 75% of the allotment is in satisfactory soil condition, 10% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment but not during the agave bolting and flowering season. (LNB) - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Sierra Vista Ranger District Huachuca EMA - short term

Allotment Name	O'Donnell	**Allotment Number**	332
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7993	**Animal Months**	1460
Capable Range	7794	**Acres per animal month**	5.3
Permitted Use	120 cow/calf; 3/1-2/28	**Projected Use**	120 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	O'Donnell Canyon	**Elevation**	5100 to 6100 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	7 pasture deferred rotation		
Planned Improvements	- Extension of existing pipeline on neighboring allotment to put a trough in the Heifer pasture.		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 35% of the allotment is in satisfactory soil condition and 65% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Allotment Name	Oak Bar	**Allotment Number**	324
5th Code Watershed	Middle Santa Cruz & Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	11314	**Animal Months**	2129
Capable Range	10704	**Acres per animal month**	5.0
Permitted Use	220 cow/calf; 3/1-2/28	**Projected Use**	175 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Three R Canyon	**Elevation**	4000 to 6400 feet
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in moderately high range condition with a static trend, 50% is moderately low with a static trend and 25% is low with a static trend. - 35% of the allotment is in satisfactory soil condition and 65% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Sierra Vista Ranger District | Huachuca EMA - short term

Allotment Name	Papago/Z-Triangle	**Allotment Number**	334
5th Code Watershed	Middle San Pedro & Cienega Creek	**4th Code Watershed**	Upper San Pedro/Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	13540	**Animal Months**	3102
Capable Range	13380	**Acres per animal month**	4.3
Permitted Use	400 cow/calf; 3/1-2/28 5 horses; 3/1-2/28	**Projected Use**	253 cow/calf; 3/1-2/28 5 horses; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	O'Donnell Creek & Cienega Creek	**Elevation**	5000 to 5953 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	14 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately low range condition with a downward trend. - 20% of the allotment is in satisfactory soil condition and 80% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs in potential habitat. (GIM) **NLAA** - Livestock grazing occurs on the allotment but the population is protected from direct effects of grazing. (HWU)		

Allotment Name	Post Canyon	**Allotment Number**	336
5th Code Watershed	Middle San Pedro	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4491	**Animal Months**	1500
Capable Range	4491	**Acres per animal month**	3.0
Permitted Use	120 cow/calf; 3/1-2/28	**Projected Use**	450 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Post Canyon	**Elevation**	4850 to 5800 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pastures on/off		
Planned Improvements	- Possible cross fencing of the Cemetary and Mountain pastures.		
Allotment Condition	- The overall trend for the allotment is downward. 35% of the allotment is in moderately high range condition with a static trend and 65% is moderately low with a downward trend. - 35% of the allotment is in satisfactory soil condition and 65% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Sierra Vista Ranger District

Huachuca EMA - short term

Allotment Name	Red Mountain	**Allotment Number**	337
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1220	**Animal Months**	183
Capable Range	878	**Acres per animal month**	4.8
Permitted Use	15 cow/calf; 3/1-2/28	**Projected Use**	15 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	None	**Elevation**	4300 to 6800 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 90% of the allotment is in satisfactory soil condition and 10% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB)		

Allotment Name	Santa Cruz	**Allotment Number**	351
5th Code Watershed	Middle Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	11652	**Animal Months**	3407
Capable Range	11339	**Acres per animal month**	3.3
Permitted Use	380 cow/calf; 3/1-2/28	**Projected Use**	284 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Wild Hog Canyon	**Elevation**	3800 to 6600 feet
Major Vegetation type	desert grassland		
Type of grazing system	7 pasture deferred rotation		
Planned Improvements	- A 1.5 mile fence to divide the Shamrock pasture. - Extension of an existing pipeline to supply water to the western end of the Wild Hog and Upper Paloma pastures and the northern end of the Shamrock pasture.		
Allotment Condition	- The overall trend for the allotment is static. 35% of the allotment is in moderately high range condition with a static trend and 65% is moderately low with a static trend. - 25% of the allotment is in satisfactory soil condition and 75% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF) - Livestock grazing occurs in compliance with Biological Opinion issued in 1994. (PPC)		

Sierra Vista Ranger District Huachuca EMA - short term

Allotment Name	Sawtelle	**Allotment Number**	339
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6866	**Animal Months**	1034
Capable Range	6662	**Acres per animal month**	6.4
Permitted Use	85 cow/calf; 3/1-2/28	**Projected Use**	85 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Turkey Creek	**Elevation**	4975 to 6100 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	9 pasture deferred rotation		
Planned Improvements	Maintenance and reconstruction of existing fences.		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - Half of the allotment is in satisfactory soil condition and half is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS)		

Allotment Name	Seibold	**Allotment Number**	340
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3145	**Animal Months**	600
Capable Range	2971	**Acres per animal month**	5.0
Permitted Use	50 cow/calf; 3/1-2/28	**Projected Use**	50 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Redrock Canyon	**Elevation**	4200 to 5300 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pasture rest rotation with Crittenden Allotment		
Planned Improvements	- Pipeline extension to Red Bear, west Corral canyon, upper Oak Grove, and Lampshire.		
Allotment Condition	- The overall trend for the allotment is static. 70% of the allotment is in moderately low range condition with a static trend and 30% is moderately low with a downward trend. - 20% of the allotment is in satisfactory soil condition and 80% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock grazing occurs in occupied and potential habitat. (GIM)		

Sierra Vista Ranger District — Huachuca EMA - short term

Allotment Name	Sycamore	**Allotment Number**	344
5th Code Watershed	Middle San Pedro	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	564	**Animal Months**	147
Capable Range	564	**Acres per animal month**	3.8
Permitted Use	32 cow/calf; 3/1-2/28	**Projected Use**	200 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	None	**Elevation**	4800 to 5000 feet
Major Vegetation type	desert grassland		
Type of grazing system	2 pastures of Holistic Resource Mgmt operation with state, private and BLM land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately low range condition with a downward trend. - All of the allotment is in unsatisfactory soil condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Allotment Name	U-D	**Allotment Number**	347
5th Code Watershed	Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1085	**Animal Months**	243
Capable Range	1016	**Acres per animal month**	4.2
Permitted Use	20 cow/calf; 3/1-2/28	**Projected Use**	20 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	None	**Elevation**	5000 to 6110 feet
Major Vegetation type	plains grassland		
Type of grazing system	18 paddocks of Holistic Resource Mgmt operation with private land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 20% of allotment is in satisfactory soil condition and 80% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock use tanks with salamanders or within the range of the salamander. (STS)		

Sierra Vista Ranger District | Huachuca EMA - short term

Allotment Name	Weiland	**Allotment Number**	349
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2088	**Animal Months**	389
Capable Range	1515	**Acres per animal month**	3.4
Permitted Use	32 cow/calf; 3/1-2/28 5 cow/calf; 3/1-2/28; private land permit	**Projected Use**	32 cow/calf; 3/1-2/28 5 cow/calf; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Harshaw	**Elevation**	4200 to 6400 feet
Major Vegetation type	broadleaf woodland		
Planned Improvements	None		
Type of grazing system	6 pasture deferred rotation		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately low range condition with a downward trend. - 75% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Sierra Vista Ranger District | Whetstone EMA - short term

Allotment Name	Benson	**Allotment Number**	303
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4176	**Animal Months**	1440
Capable Range	3516	**Acres per animal month**	2.3
Permitted Use	120 cow/calf; 3/1-2/28; 7 cow/calf; 3/1-2/28; private land permit	**Projected Use**	120 cow/calf; 3/1-2/28; 7 cow/calf; 3/1-2/28; private land permit
		Utilization Level	45% max utilization
Major Drainage	Cottonwood Canyon	**Elevation**	4600 to 6600 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	5 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 45% of the allotment is in satisfactory soil condition and 55% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Sierra Vista Ranger District | Whetstone EMA - short term

Allotment Name	Coal Mine	**Allotment Number**	316
5th Code Watershed	Cienega Creek	**4th Code Watershed**	Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3003	**Animal Months**	1217
Capable Range	1399	**Acres per animal month**	1.1
Permitted Use	166 cow/calf; 10/1-3/30	**Projected Use**	202 cow/calf; 10/1-3/30
		Utilization Level	45% max utilization
Major Drainage	Shellenberger Canyon	**Elevation**	5000 to 7700 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 95% of the allotment is in moderately high range condition with a static trend and 5% is moderately low with a static trend. - 30% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 40% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment but not during agave bolting and flowering season. (LNB)		

Allotment Name	Knear	**Allotment Number**	302
5th Code Watershed	Middle San Pedro/Cienega Creek	**4th Code Watershed**	Upper San Pedro/Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3899	**Animal Months**	1440
Capable Range	3304	**Acres per animal month**	2.3
Permitted Use	120 cow/calf; 3/1-2/28	**Projected Use**	120 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	None	**Elevation**	4400 to 6000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	4 pasture deferred rotation		
Planned Improvements	Redevelopment of two old, abandoned wells in the Wildcat and Mountain pastures.		
Allotment Condition	- The overall trend for the allotment is static. 75% of the allotment is in moderately high range condition with a static trend and 25% is moderately low with a static trend. - 65% of the allotment is in satisfactory soil condition and 35% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Sierra Vista Ranger District | Whetstone EMA - short term

Allotment Name	Mescal	**Allotment Number**	318
5th Code Watershed	Middle San Pedro River & Cienega Creek	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	17686	**Animal Months**	4800
Capable Range	6989	**Acres per animal month**	1.5
Permitted Use	800 cow/calf; 11/1-4/30	**Projected Use**	800 cow/calf; 11/1-4/30
		Utilization Level	45% max utilization
Major Drainage	French Joe, Dry Canyon	**Elevation**	4600 to 7670 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	3 pasture rotation		
Planned Improvements	Two trick tanks and three miles of fence are planned to better regulate livestock movements.		
Allotment Condition	- The overall trend for the allotment is static. 85% of the allotment is in moderately high range condition with a static trend and 15% is moderately low with a downward trend. - 90% of the allotment is in satisfactory soil condition and 10% is impaired.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment but not during agave bolting and flowering season. (LNB) - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Allotment Name	Middle Canyon	**Allotment Number**	306
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6802	**Animal Months**	1284
Capable Range	2464	**Acres per animal month**	1.9
Permitted Use	107 cow/calf; 3/1-2/28	**Projected Use**	107 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Guindani Canyon	**Elevation**	4800 to 7350 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	7 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 85% of the allotment is in moderately high range condition with a static trend and 15% is moderately low with a static trend. - 70% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment but not during agave bolting and flowering season. (LNB)		

Safford Ranger District | Galiuro EMA - short term

Allotment Name	Bottle Canyon	**Allotment Number**	427
5th Code Watershed	Aravaipa	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3787	**Animal Months**	780
Capable Range	1808	**Acres per animal month**	2.3
Permitted Use	130 cow/calf; 11/1-4/30	**Projected Use**	130 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Bottle Canyon	**Elevation**	4000 to 5700 feet
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	2 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 55% of the allotment is in satisfactory soil condition and 45% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Allotment Name	Bull Tank	**Allotment Number**	434
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5433	**Animal Months**	480
Capable Range	4129	**Acres per animal month**	8.6
Permitted Use	40 cow/calf; 3/1-2/28	**Projected Use**	40 cow/calf; 3/1-2/28
		Utilization Level	40% max utilization
Major Drainage	North and South Oak Creeks	**Elevation**	
Major Vegetation type	desert grassland; coniferous woodland; broadleaf woodland		
Type of grazing system	6 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 30% of the allotment is in moderately high range condition with an upward trend and 70% is moderately high with a static trend. - 25% of the allotment is in satisfactory soil condition, 55% is unsatisfactory and 20% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Safford Ranger District | Galiuro EMA - short term

Allotment Name	Copper Creek	**Allotment Number**	444
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3866	**Animal Months**	690
Capable Range	245	**Acres per animal month**	0.4
Permitted Use	60 cow/calf; 11/1-3/31 15 cow/calf; 11/1-4/30; private land permit	**Projected Use**	120 cow/calf; 11/1-3/31 10 cow/calf; 11/1-4/30; private land permit
		Utilization Level	50% max utilization for uplands, 40% for riparian areas
Major Drainage	Copper Creek; Scanlan Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture winter use		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 55% of the allotment is in satisfactory soil condition and 45% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	Deer Creek	**Allotment Number**	429
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	32416	**Animal Months**	1200
Capable Range	5943	**Acres per animal month**	5.0
Permitted Use	100 cow/calf; 3/1-2/28	**Projected Use**	100 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Deer Creek, Rattlesnake Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	9 pasture rest rotation with state land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 80% of the allotment is in satisfactory soil condition, 10% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in riparia areas. (BAE) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Safford Ranger District | Galiuro EMA - short term

Allotment Name	Four Mile	**Allotment Number**	425
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8659	**Animal Months**	600
Capable Range	1238	**Acres per animal month**	2.1
Permitted Use	50 cow/calf; 3/1-2/28	**Projected Use**	50 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Four Mile Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 65% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks but a small portion of the allotment is capable range. (LNB)		

Allotment Name	Paddy's River	**Allotment Number**	430
5th Code Watershed	Aravaipa	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8758	**Animal Months**	850
Capable Range	2991	**Acres per animal month**	3.5
Permitted Use	170 cow/calf; 11/1-3/31	**Projected Use**	170 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	Paddy's River	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 70% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District | Galiuro EMA - short term

Allotment Name	Squaw Basin	**Allotment Number**	426
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5064	**Animal Months**	600
Capable Range	2723	**Acres per animal month**	4.5
Permitted Use	50 cow/calf; 3/1-2/28	**Projected Use**	50 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Bottle Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system			
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 25% of the allotment is in satisfactory soil condition and 75% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	Sunset	**Allotment Number**	431
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1591	**Animal Months**	300
Capable Range	1203	**Acres per animal month**	4.0
Permitted Use	25 cow/calf; 3/1-2/28	**Projected Use**	25 cow/calf; 3/1-2/28
		Utilization Level	40% max utilization
Major Drainage	Black Canyon	**Elevation**	
Major Vegetation type	desert grassland; coniferous woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 60% of the allotment is in satisfactory condition, 30% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District — Galiuro EMA - short term

Allotment Name	Willow Creek	**Allotment Number**	428
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4318	**Animal Months**	925
Capable Range	3238	**Acres per animal month**	3.5
Permitted Use	140 cow/calf; 11/1-4/30	**Projected Use**	185 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization
Major Drainage	Willow Creek	**Elevation**	
Major Vegetation type	desert grassland; coniferous woodland		
Type of grazing system	1 pasture winter use		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 90% of the allotment is in moderately high range condition with an upward trend and 10% is moderately low with an upward trend. - 15% of the allotment is in satisfactory soil condition, 75% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	YLE	**Allotment Number**	442
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6771	**Animal Months**	492
Capable Range	1386	**Acres per animal month**	2.8
Permitted Use	82 cow/calf; 3/1-2/28	**Projected Use**	82 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization in uplands (35% in the wilderness) and 40% use in riparian areas
Major Drainage	YLE canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 70% of the allotment is in high range condition with a static trend and 30% is moderately high with an upward trend. - 5% of the allotment is in satisfactory soil condition, 80% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District | Pinaleño EMA - short term

Allotment Name	Gillespie	**Allotment Number**	417
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8172	**Animal Months**	564
Capable Range	5973	**Acres per animal month**	10.6
Permitted Use	47 cow/calf; 3/1-2/28	**Projected Use**	47 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Stockton Wash	**Elevation**	
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	9 pasture High Intensity/Short Duration		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 25% of the allotment is in satisfactory soil condition, 60% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Allotment Name	Grant Creek	**Allotment Number**	413
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6073	**Animal Months**	360
Capable Range	3194	**Acres per animal month**	8.9
Permitted Use	30 cow/calf; 3/1-2/28	**Projected Use**	30 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization in the uplands and 40% in the riparian areas
Major Drainage	Grant Creek	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland; coniferous forest		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 5% of the allotment is in high range condition with an upward trend, 20% is moderately high with an upward trend, 50% is moderately high with a static trend, 5% is moderately low with an upward trend, 15% is moderately low with a static trend and 5% is low with an upward trend. - 45% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 25% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Safford Ranger District | Pinaleño EMA - short term

Allotment Name	Hawk Hollow	**Allotment Number**	414
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3967	**Animal Months**	165
Capable Range	2745	**Acres per animal month**	16.7
Permitted Use	20 cow/calf; 11/1-5/31	**Projected Use**	24 cow/calf; 11/1-5/31
		Utilization Level	50% max utilization
Major Drainage	Frye Creek & Cave Creek	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	2 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 70% of the allotment is in moderately high range condition with an upward trend and 30% is moderately high with a static trend. - 30% of the allotment is in satisfactory soil condition, 60% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Marijilda	**Allotment Number**	415
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	12466	**Animal Months**	360
Capable Range	4325	**Acres per animal month**	12.0
Permitted Use	30 cow/calf; 3/1-2/28	**Projected Use**	30 cow/calf; 3/1-2/28
		Utilization Level	40% max utilization
Major Drainage	Marijilda & Deadman Creeks	**Elevation**	
Major Vegetation type	southwestern desertscrub; broadleaf woodland; coniferous forest		
Type of grazing system	5 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. 35% of the allotment is in moderately high range condition with an upward trend, 25% is moderately high with a static trend and 40% is moderately low with a downward trend. - 65% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Safford Ranger District | Pinaleño EMA - short term

Allotment Name	O Bar O Canyon	**Allotment Number**	452
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6263	**Animal Months**	1375
Capable Range	5365	**Acres per animal month**	3.9
Permitted Use	275 cow/calf; 11/1-2/28	**Projected Use**	275 cow/calf; 11/1-2/28
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	O-O Canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	4 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 25% of the allotment is in satisfactory soil condition, 70% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	Redtail	**Allotment Number**	421
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2552	**Animal Months**	425
Capable Range	2511	**Acres per animal month**	5.9
Permitted Use	85 cow/calf; 11/1-3/31	**Projected Use**	85 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	Wood Canyon Wash	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in high range condition with a static trend. - All of the allotment is unsatisfactory soil condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District | Pinaleño EMA - short term

Allotment Name	Shingle Mill	**Allotment Number**	411
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	34042	**Animal Months**	1560
Capable Range	23200	**Acres per animal month**	14.9
Permitted Use	200 cow/calf; 3/1-2/28 10 horses; 3/1-2/28 5 horses; 3/1-2/28; private land permit	**Projected Use**	200 cow/calf; 3/1-2/28 10 horses; 3/1-2/28 5 horses; 3/1-2/28; private land permit
		Utilization Level	40% max utilization
Major Drainage	Tripp, N. Taylor, Carter, NuHull, Shingle Mill Canyons	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	5 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 35% of the allotment is in moderately high range condition with an upward trend, 40% is moderately high with a static trend, 20% is moderately low with a downward trend and 5% is moderately low with a downward trend. - 55% of the allotment is in satisfactory soil condition, 35% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB)		

Allotment Name	Ten	**Allotment Number**	422
5th Code Watershed	San Simon River	**4th Code Watershed**	San Simon
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6490	**Animal Months**	1200
Capable Range	6140	**Acres per animal month**	5.1
Permitted Use	153 cow/calf; 11/1-4/30	**Projected Use**	100 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization on uplands 40% in the riparian areas
Major Drainage	Sycamore Canyon, Willow Spring Wash	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 10% of the allotment is in satisfactory soil condition, 85% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District Pinaleño EMA - short term

Allotment Name	Veach	**Allotment Number**	416
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	12860	**Animal Months**	1375
Capable Range	7549	**Acres per animal month**	5.5
Permitted Use	275 cow/calf; 11/1-4/30	**Projected Use**	275 cow/calf; 12/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Veach, Dutch Henry Canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 90% of the allotment is in moderately high range condition with a static trend and 10% is moderately low with a downward trend. - 50% of the allotment is in satisfactory soil condition, 35% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	White Streaks	**Allotment Number**	423
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5186	**Animal Months**	228
Capable Range	3141	**Acres per animal month**	13.8
Permitted Use	38 cow/calf; 11/1-4/30	**Projected Use**	38 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	Ash Creek	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland; coniferous forest		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 75% of the allotment is in moderately high range condition with a static trend and 25% is moderately low with a downward trend. - 50% of the allotment is in satisfactory soil condition, 40% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Safford Ranger District | Santa Teresa EMA - short term

Allotment Name	Jakes	**Allotment Number**	408
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3665	**Animal Months**	372
Capable Range	1183	**Acres per animal month**	3.2
Permitted Use	421 cow/calf; 3/1-2/28; on/off	**Projected Use**	186 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Buford Canyon	**Elevation**	
Major Vegetation type	chaparral; broadleaf woodland		
Type of grazing system	3 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. Half of the allotment is in moderately high range condition with an upward trend and half is moderately high with a static trend. - 15% of the allotment is in satisfactory soil condition, 55% is unsatisfactory and 30% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	Kane Springs	**Allotment Number**	405
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	699	**Animal Months**	84
Capable Range	116	**Acres per animal month**	1.4
Permitted Use	17 cow/calf; 11/1-3/31	**Projected Use**	17 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization
Major Drainage	Beauchamp Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with an upward trend. - 90% of the allotment is in satisfactory soil condition, 5% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves but outside the bolting and flowering season. (LNB)		

Safford Ranger District

Santa Teresa EMA - short term

Allotment Name	Laurel Canyon/ South Reef	**Allotment Number**	401/451
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7997	**Animal Months**	600
Capable Range	2117	**Acres per animal month**	3.5
Permitted Use	44 cow/calf; 10/1-3/31	**Projected Use**	100 cow/calf; 10/1-3/31
		Utilization Level	50% max utilization
Major Drainage	Laurel Canyon	**Elevation**	
Major Vegetation type	chaparral		
Type of grazing system	2 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for these allotments is upward. 80% of the allotment is in moderately high range condition with an upward trend and 20% is moderately high with a static trend. - 30% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 50% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Allotment Name	North Reef	**Allotment Number**	402
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6762	**Animal Months**	500
Capable Range	1783	**Acres per animal month**	3.6
Permitted Use	100 cow/calf; 11/1-3/31	**Projected Use**	100 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	Upper Black Rock & Cottonwood Canyons	**Elevation**	4800 to 6200 feet
Major Vegetation type	chaparral		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 85% of the allotment is in moderately high range condition with an upward trend and 15% is moderately high with a static trend. - 35% of the allotment is in satisfactory soil condition, 60% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District — Santa Teresa EMA - short term

Allotment Name	South Goodwin	**Allotment Number**	403
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8738	**Animal Months**	648
Capable Range	1107	**Acres per animal month**	1.7
Permitted Use	54 cow/calf; 3/1-2/28	**Projected Use**	54 cow/calf; 3/1-2/28
		Utilization Level	35% max utilization
Major Drainage	South Fork Goodwin Canyon	**Elevation**	
Major Vegetation type	chaparral		
Type of grazing system	2 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 5% of the allotment is in moderately high range condition with an upward trend, 10% is moderately high with a static trend, 75% is moderately low with a static trend and 10% is moderately low with a downward trend. - 65% of the allotment is in satisfactory soil condition, 25% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in MSO habitat. (MSO) - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks but utilization level is light and small percentage of the allotment is capable range. (LNB)		

Safford Ranger District — Winchester EMA - short term

Allotment Name	Oak Grove	**Allotment Number**	447
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4932	**Animal Months**	600
Capable Range	892	**Acres per animal month**	1.5
Permitted Use	312 cow/calf; 3/1-2/28	**Projected Use**	312 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization on uplands and 40% in riparian areas
Major Drainage	Oak Grove Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 95% of the allotment is in satisfactory soil condition and 5% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District | Winchester EMA - short term

Allotment Name	Polecat	**Allotment Number**	448
5th Code Watershed	Lower San Pedro River	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3429	**Animal Months**	204
Capable Range	1341	**Acres per animal month**	6.5
Permitted Use	52 cow/calf; 3/1-2/28	**Projected Use**	52 cow/calf; 3/1-2/28
		Utilization Level	40% max utilization
Major Drainage	none	**Elevation**	
Major Vegetation type	coniferous woodland		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 5% of the allotment is in high range condition with a static trend and 95% is moderately high with a static trend. - 90% of the allotment is in satisfactory soil condition and 10% is unsatisfactory.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment during the agave flowering and bolting season but vegetation types do not support high densities of agaves. (LNB)		

Santa Catalina Ranger District | Santa Catalina EMA - short term

Allotment Name	American Flag/Interocean	**Allotment Number**	506
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	25566	**Animal Months**	3629
Capable Range	12488	**Acres per animal month**	3.4
Permitted Use	150 cow/calf; 4/1-8/31 546 cow/calf; 6/15-10/31 65 cow/calf; 6/15-12/31	**Projected Use**	150 cow/calf; 4/1-8/31 546 cow/calf; 6/15-10/31 65 cow/calf; 6/15-12/31
		Utilization level	45% max. utilization
Major Drainage	Nugget Canyon, Peppersauce Canyon, Bonito Wash & Smelter Wash	**Elevation**	4,500 to 8,200 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	4 pasture rotation		
Planned improvements	None		
Allotment Condition	- 25% of the allotment is in moderately high range condition, 70% is moderately low and 5% is low (1974, 1975). - 60% of the allotment is in satisfactory condition, 25% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Santa Catalina Ranger District — Santa Catalina EMA - short term

Allotment Name	Bellota	**Allotment Number**	502
5th Code Watershed	Lower San Pedro/Rillito Creek	**4th Code Watershed**	Lower San Pedro/Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	37285	**Animal Months**	4800
Capable Range	32375	**Acres per animal month**	6.7
Permitted Use	400 cow/calf; 3/1-2/28	**Projected Use**	400 cow/calf; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Agua Caliente, Tanque Verde, Bullock Canyons	**Elevation**	3,400 to 7,300 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland; coniferous woodland		
Type of grazing system	7 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- 55% of the allotment is in low range condition and 45% is moderately low (1976). - 55% of the allotment is in satisfactory soil condition and 45% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs in excess of 30% in unsurveyed areas thought to be suitable habitat. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Cañada del Oro	**Allotment Number**	503
5th Code Watershed	Cañada del Oro	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	21224	**Animal Months**	1500
Capable Range	9849	**Acres per animal month**	6.6
Permitted Use	350 cow/calf; 10/1-3/31	**Projected Use**	250 cow/calf; 10/1-3/31
		Utilization level	45% max utilization
Major Drainage	Cañada del Oro	**Elevation**	4,500 to 9,150 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- 65% of allotment is in moderately high range condition and 35% is moderately low (1999). - 95% of the allotment is in satisfactory soil condition and 5% is impaired (1999).		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves but not during the time when agaves are producing flower stalks. (LNB) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs at levels in excess of 30% in areas thought to be suitable habitat but there is limited acreage below 4,000 feet. (CFP) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Santa Catalina Ranger District

Santa Catalina EMA - short term

Allotment Name	Cumero	**Allotment Number**	520
5th Code Watershed	Lower San Pedro/Cienega Creek	**4th Code Watershed**	Lower San Pedro/Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	13085	**Animal Months**	1548
Capable Range	7128	**Acres per animal month**	4.6
Permitted Use	125 cow/calf; 3/1-2/28 4 horse; 3/1-2/28	**Projected Use**	125 cow/calf; 3/1-2/28 4 horse; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Cumero & Ash Creek	**Elevation**	4,000 to 8,500 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- 60% of allotment is in moderately low range condition and 40% is moderately high (1983). - 75% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs at levels in excess of 30% in areas that may be suitable habitat. (CFP) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Finley Springs	**Allotment Number**	505
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	16034	**Animal Months**	1800
Capable Range	7975	**Acres per animal month**	4.4
Permitted Use	175 cow/calf; 3/1-2/28	**Projected Use**	150 cow/calf; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Edgar Canyon, Bushman Canyon	**Elevation**	3,840 to 8,550 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- 95% of the allotment is in moderately low range condition and 5% is low (1983). . - 55% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs at levels in excess of 30% in areas thought to be suitable habitat but there is limited acreage below 4,000 feet. (CFP) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Santa Catalina Ranger District | Santa Catalina EMA - short term

Allotment Name	Last Chance	**Allotment Number**	516
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6207	**Animal Months**	130
Capable Range	2941	**Acres per animal month**	22.6
Permitted Use	80 cow/calf; 3/1-2/28	**Projected Use**	80 cow/calf; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Espiritu Canyon	**Elevation**	4,250 to 7,150 feet
Major Vegetation type	broadleaf woodland; southwestern desertscrub		
Type of grazing system	4 pasture deferred rotation with state and private land		
Planned Improvements	None		
Allotment Condition	- 5% of the allotment is in high range condition, 45% is moderately high and 50% is moderately low (1995). - 70% of the allotment is in satisfactory soil condition, 25% is impaired and 10% is unsuited (1996).		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks but there is a limited amount of capable range. (LNB) - Livestock grazing occurs at levels in excess of 30% in areas that may be suitable habitat. (CFP) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Samaniego	**Allotment Number**	513
5th Code Watershed	Cañada del Oro	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	17679	**Animal Months**	2682
Capable Range	10929	**Acres per animal month**	4.1
Permitted Use	354 yearlings; 10/1-3/31	**Projected Use**	347 yearlings; 10/1-3/31 50 cow/calf; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Dodge Wash & Carrista Canyon	**Elevation**	3,100 to 7,500 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	4 pasture rotation		
Planned Improvements	None		
Allotment Condition	- 35% of the allotment is in moderately high range condition, 40% is moderately high and 25% is low (1977). - 65% of the allotment is in satisfactory soil condition, 25% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs in areas thought to be unsurveyed suitable habitat at levels greater than 30%. (CFP) - Livestock gathering activities occur in what is thought to be unsurveyed suitable habitat. (CFP) **NLAA** - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Long-term proposals

Douglas Ranger District | Chiricahua EMA - long term

Allotment Name	Oak	**Allotment Number**	111
5th Code Watershed	White Water Draw	**4th Code Watershed**	White Water Draw
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4085	**Animal Months**	480
Capable Range	2041	**Acres per animal month**	4.2
Permitted Use	60 cow/calf; 11/1-4/30	**Projected Use**	80 cow/calf; 11/1-4/30
		Utilization Level	45% max utilization
Major Drainage	Cottonwood Canyon	**Elevation**	5500 to 8000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- Overall trend of the allotment is upward. 95% of the allotment is in moderately high range condition with an upward trend and 5% is moderately high with a static trend. - 70% of allotment in satisfactory soil condition, 10% unsatisfactory & 20% unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves during the first 2 weeks of the time when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in riparian areas and all disturbing activities are excluded within 900 meters of a nest site during the breeding season. (APF)		

Allotment Name	Tex Canyon	**Allotment Number**	121
5th Code Watershed	San Simon Creek & San Bernardino Valley	**4th Code Watershed**	San Simon Creek & San Bernardino Valley
Allotment Acres		**Projected Stocking Rate**	
Total Acres	18336	**Animal Months**	3399
Capable Range	16589	**Acres per animal month**	5.8
Permitted Use	600 cow/calf 11/1-2/28; 150 cow/calf 12/1-2/28; 8 horses 3/1-2/28; 31 yearlings 10/1-4/15; 60 bulls 10/1-2/28	**Projected Use**	600 cow/calf 11/1-2/28; 150 cow/calf 12/1-2/28; 8 horses 3/1-2/28; 31 yearlings 10/1-4/15; 60 bulls 10/1-2/28
		Utilization Level	55% max utilization
Major Drainage	Tex Canyon & Shake Gulch	**Elevation**	5000 to 7500 feet
Major Vegetation type	chaparral; broadleaf woodland; coniferous woodland		
Type of grazing system	8 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend of the allotment is upward. 10% of the allotment is in moderately high range condition with a static trend, 55% is moderately low with an upward trend and 35% is moderately low with a static trend. - 40% of the allotment is in satisfactory condition, 25% is impaired, 25% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization level exceeds 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) Livestock grazing occurs in riparian areas and all disturbing activities are excluded within 900 meters of a nest site during the breeding season. (APF)		

Douglas Ranger District — Dragoon EMA - long term

Allotment Name	Fourr	**Allotment Number**	153
5th Code Watershed	Middle San Pedro River	**4th Code Watershed**	Upper San Pedro
Allotment Acres **Total Acres** **Capable Range**	 3617 1075	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 704 1.5
Permitted Use	117 cow/calf; 11/15-5/15	**Projected Use**	117 cow/calf; 11/15-5/15
		Utilization Level	45% max utilization
Major Drainage	Fourr Canyon	**Elevation**	4200 to 7450 feet
Major Vegetation type	desert grassland; broadleaf woodland; coniferous woodland		
Type of grazing system	10 pasture, best pasture system with NF, state and private land		
Planned Improvements	- Develop Spring - South Boundary		
Allotment Condition	- The overall trend for the allotment is upward. 35% of the allotment is in moderately high range condition with a static trend and 35% is moderately low with an upward trend. - 65% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Douglas Ranger District — Peloncillo EMA - long term

Allotment Name	Walnut Canyon	**Allotment Number**	132
5th Code Watershed	San Simon Creek & Animas Creek	**4th Code Watershed**	San Simon/Animas Valley
Allotment Acres **Total Acres** **Capable Range**	 15359 14555	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 3252 4.5
Permitted Use	271 cow/calf; 3/1-2/28	**Projected Use**	271 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Skeleton & Dutchman Canyons	**Elevation**	5100 to 6500 feet
Major Vegetation type	coniferous woodland		
Type of grazing system	9 pasture HRM with 3 NF pastures		
Planned Improvements	- Waterlot twin ponds - Waterlot Big Lake		
Allotment Condition	- The overall trend for the allotment is static. 10% of the allotment is in moderately high range condition with an upward trend, 85% is moderately high with a static trend and 5% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition, 30% is impaired and 20% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB, MLB) - Utilization levels exceed 45%. (LNB, MLB) - Livestock grazing occurs in areas over 5,000 feet in elevation. (NMR) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) Livestock grazing occurs in riparian areas and all disturbing activities are excluded within 900 meters of a nest site during the breeding season. (APF)		

Nogales Ranger District — Santa Rita EMA - long term

Allotment Name	Agua Caliente	**Allotment Number**	245
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	9234	**Animal Months**	660
Capable Range	3966	**Acres per animal month**	6.0
Permitted Use	110 cow/calf; 11/1-4/30	**Projected Use**	110 cow/calf; 11/1-4/30
		Utilization level	50% max utilization
Major Drainage	Agua Caliente Canyon	**Elevation**	
Major Vegetation type	desert grassland; coniferous forest		
Type of grazing system	1 pasture season long		
Planned Improvements	- South Boundary Tank: Clean and seal		
Allotment Condition	- The overall trend for the allotment is static. 20% of the allotment is in high range condition with a static trend, 60% is moderately high with a static trend and 20% is moderately low with a static trend. - 30% of the allotment is in satisfactory soil condition, 20% is impaired, 25% is unsatisfactory and 25% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs and watershed and riparian conditions are unsatisfactory. (APF) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest .(JAG) - The presence of suitable CFPO habitat is considered to be unlikely, but habitat assessments have not been made using Arizona Game and Fish Department protocol to confirm the absence of suitable habitat. (CFP) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Allotment Name	Alto	**Allotment Number**	246
5th Code Watershed	Lower Santa Cruz/Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	11216	**Animal Months**	1776
Capable Range	6033	**Acres per animal month**	3.3
Permitted Use	296 cow/calf; 10/1-3/31 3 horses; 3/1-2/28	**Projected Use**	296 cow/calf; 10/1-3/31 3 horses; 3/1-2/28
		Utilization level	50% max utilization
Major Drainage	Josephine Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	- HQ corral: reconstruct - HQ well: install solar system		
Allotment Condition	- The overall trend for the allotment is static. 20% of the allotment is in high range condition with a static trend, 60% is moderately high with a static trend and 20% is moderately low with a static trend. - 35% of the allotment is in satisfactory soil condition, 30% is impaired, 10% is unsatisfactory and 25% is unsuited.		
Management Actions that contribute to effects	**LAA** - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Allotment Name	Apache Springs	**Allotment Number**	240
5th Code Watershed	Cienega Creek/Sonoita Creek	**4th Code Watershed**	Rillito/Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	13073	**Animal Months**	3492
Capable Range	9978	**Acres per animal month**	2.9
Permitted Use	140 cow/calf; 3/1-2/28	**Projected Use**	140 cow/calf; 3/1-2/28
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Gardner Canyon	**Elevation**	
Major Vegetation type	coniferous woodland		
Type of grazing system	8 pasture deferred rotation		
Planned Improvements	- Fish Canyon well: convert to solar power - Pasture 6 well: convert to solar power - Aliso Spring pipeline: replace		
Allotment Condition	- The overall trend for the allotment is static. Half of the allotment is in high range condition with a static trend, 10% is moderately high with an upward trend and 40% is moderately high with a static trend. - 80% of the allotment is in satisfactory soil condition, 15% is impaired and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of known roost. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Allotment Name	Box Canyon	**Allotment Number**	235
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3131	**Animal Months**	1200
Capable Range	1804	**Acres per animal month**	1.5
Permitted Use	100 cow/calf; 3/1-2/28	**Projected Use**	120 cow/calf; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Box Canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub; broadleaf woodland; coniferous woodland		
Type of grazing system	6 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 10% of the allotment is in high range condition with a static trend, 60% is moderately high with an upward trend and 90% is moderately high with a static trend. - 65% of the allotment is in satisfactory soil condition, 25% is impaired and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Debaud	**Allotment Number**	232
5th Code Watershed	Cienega Creek	**4th Code Watershed**	Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2795	**Animal Months**	600
Capable Range	2707	**Acres per animal month**	4.5
Permitted Use	150 cow/calf; 11/1-2/28	**Projected Use**	150 cow/calf; 11/1-2/28
		Utilization level	35% utilization in growing season, 55% utilization in dormant season
Major Drainage	Papago Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in high range condition with an upward trend and 75% is moderately high with a static trend. - Half of the allotment is in satisfactory soil condition and half is impaired.		
Management Actions that contribute to effects	**LAA** - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Fort	**Allotment Number**	247
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7103	**Animal Months**	765
Capable Range	5520	**Acres per animal month**	7.2
Permitted Use	85 cow/calf; 12/1-8/30	**Projected Use**	85 cow/calf; 12/1-8/30
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Adobe Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture deferred rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in high range condition with a static trend and 75% is moderately high with a static trend. - 55% of the allotment is in satisfactory soil condition, 15% is impaired, 15% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed habitat or potential habitat. NAF)		

Nogales Ranger District Santa Rita EMA - long term

Allotment Name	Gardner Canyon	**Allotment Number**	241
5th Code Watershed	Cienega Creek/Sonoita Creek	**4th Code Watershed**	Rillito/Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	12353	**Animal Months**	1515
Capable Range	12307	**Acres per animal month**	8.1
Permitted Use	211 cow/calf 6/1-10/31; 211 cow/calf 12/1-2/28; 20 cow/calf 6/1-10/31 private land permit; 20 cow/calf 12/1-2/28 private land permit	**Projected Use**	211 cow/calf 6/1-10/31; 211 cow/calf 12/1-2/28; 20 cow/ calf 6/1-10/31 private land permit; 20 cow/calf 12/1-2/28 private land permit
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Gardner Canyon	**Elevation**	
Major Vegetation type	plains grassland		
Type of grazing system	3 pasture rotation		
Planned Improvements	- Allotment boundary fence: reconstruct 1.5 miles		
Allotment Condition	- The overall trend for the allotment is static. 10% of the allotment is in moderately high range condition with an upward trend and 90% is moderately high with a static trend. - 80% of the allotment is in satisfactory soil condition and 20% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Allotment Name	Greaterville	**Allotment Number**	238
5th Code Watershed	Lower Santa Cruz/Cienega Creek	**4th Code Watershed**	Upper Santa Cruz/Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4549	**Animal Months**	1625
Capable Range	4228	**Acres per animal month**	2.6
Permitted Use	325 cow/calf; 4/1-8/31	**Projected Use**	325 cow/calf; 4/1-8/31
		Utilization level	35% utilization in growing season, 55% utilization in dormant season
Major Drainage	Enzenberg Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland; coniferous woodland		
Type of grazing system	5 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 40% of the allotment is in high range condition with a static trend and 60% is moderately high with a static trend. - 80% of the allotment is in satisfactory soil condition and 20% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Helvetia	**Allotment Number**	233
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2159	**Animal Months**	720
Capable Range	1123	**Acres per animal month**	1.6
Permitted Use	60 cow/calf; 3/1-2/28	**Projected Use**	60 cow/calf; 3/1-2/28
		Utilization level	55% max utilization
Major Drainage	none	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	3 pasture rotation with Santa Rita Experimental Range		
Planned Improvements	- South pasture division drift fence: 0.5 miles - Solar pumping system and storage: 1 each		
Allotment Condition	- The overall trend for the allotment is upward. 30% of the allotment is in high range condition with a static trend and 70% is moderately low with an upward trend. - 30% of the allotment is in satisfactory soil condition, 50% is unsatisfactory and 20% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	McBeth	**Allotment Number**	239
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8843	**Animal Months**	1140
Capable Range	2946	**Acres per animal month**	2.6
Permitted Use	95 cow/calf; 3/1-2/28	**Projected Use**	95 cow/calf; 3/1-2/28
		Utilization level	55% max utilization
Major Drainage	Florida Canyon	**Elevation**	
Major Vegetation type	coniferous woodland		
Type of grazing system	4 pasture rest rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 35% of the allotment is in high range condition with a static trend, 35% is moderately high with a static trend and 30% is moderately low with a static trend. - 60% of the allotment is in satisfactory soil condition, 10% is unsatisfactory and 30% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - The presence of suitable CFPO habitat is considered to be unlikely, but habitat assessments have not been made using Arizona Game and Fish Department protocol to confirm the absence of suitable habitat. (CFP) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Nogales Ranger District — Santa Rita EMA - long term

Allotment Name	Oak Tree	**Allotment Number**	237
5th Code Watershed	Cienega Creek	**4th Code Watershed**	Rillito

Allotment Acres		**Projected Stocking Rate**	
Total Acres	4963	**Animal Months**	1608
Capable Range	4963	**Acres per animal month**	3.1
Permitted Use	124 cow/calf 3/1-2/28; 10 cow/ calf 3/1-2/28 private land permit	**Projected Use**	124 cow/calf 3/1-2/28; 10 cow/ calf 3/1-2/28 private land permit
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	none	**Elevation**	
Major Vegetation type	broadleaf woodland; plains grassland		
Type of grazing system	2 and 3 pasture deferred rotation systems		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is moderately high range condition with an upward trend and 75% is moderately high with a static trend. - 75% of the allotment is in satisfactory soil condition and 25% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Allotment Name	Proctor	**Allotment Number**	243
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8229	**Animal Months**	760
Capable Range	3955	**Acres per animal month**	5.2
Permitted Use	80 cow/calf; 9/16-6/30	**Projected Use**	80 cow/calf; 9/16-6/30
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Madera Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	2 pasture; winter and fall use		
Planned Improvements	- Missle stock tank: Clean tank and repair silt trap - Chino stock tank: New construction - Annex dam: New Construction		
Allotment Condition	- The overall trend for the allotment is upward. 85% of the allotment is in moderately high range condition with an upward trend and 15% is moderately low with a static trend. - 15% of the allotment is in satisfactory soil condition, 10% is impaired, 30% is unsatisfactory and 45% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs and watershed and riparian conditions are unsatisfactory. (APF) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Presence of suitable CFPO habitat is considered to be unlikely, but habitat assessments have not been made using AGFD protocol to confirm the absence of suitable habitat. (CFP) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs in compliance with Biological Opinion issued in 1994. (PPC)		

Nogales Ranger District | Santa Rita EMA - long term

Allotment Name	Rosemont	**Allotment Number**	234
5th Code Watershed	Lower Santa Cruz/Cienega	**4th Code Watershed**	Santa Cruz/Rillito
Allotment Acres **Total Acres** **Capable Range**	 9714 9072	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1575 5.8
Permitted Use	325 cow/calf, 3/1-3/31; 325 cow/calf, 9/1-10/31; 150 cow/calf, 11/1-2/28	**Projected Use**	325 cow/calf, 3/1-3/31; 325 cow/calf, 9/1-10/31; 150 cow/calf, 11/1-2/28
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Barrel Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	2 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 60% of the allotment is in satisfactory soil condition, 25% is impaired and 15% is unsatisfactory.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment but outside the agave bolting and flowering period. (LNB) - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Squaw Gulch	**Allotment Number**	248
5th Code Watershed	Sonoita Creek	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres **Total Acres** **Capable Range**	 9281 7928	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1920 4.1
Permitted Use	155 cow/calf, 3/1-2/28; 5 horses, 3/1-2/28; private land permit	**Projected Use**	155 cow/calf, 3/1-2/28; 5 horses, 3/1-2/28; private land permit
		Utilization level	35% utilization in growing season, 45% utilization in dormant season
Major Drainage	Squaw Gulch	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	8 pasture deferred rotation		
Planned Improvements	- Horse Power/Temporal stock tank: new construction - Temporal Pasture stock tank: new construction		
Allotment Condition	- The overall trend for the allotment is static. Half of the allotment is in moderately high range condition with a static trend and half is moderately low with a static trend. - 40% of the allotment is in satisfactory soil condition, 50% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - The presence of suitable CFPO habitat is considered to be unlikely, but habitat assessments have not been made using Arizona Game and Fish Department protocol to confirm the absence of suitable habitat. (CFP) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Allotment Name	Stone Springs	**Allotment Number**	231
5th Code Watershed	Lower Santa Cruz/Cienega	**4th Code Watershed**	Upper Santa Cruz/Rillito
Allotment Acres **Total Acres** **Capable Range**	 8794 6972	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1470 4.7
Permitted Use	245 cow/calf; 10/1-3/31	**Projected Use**	245 cow/calf; 10/1-3/31
		Utilization level	45% max utilization
Major Drainage	Sycamore Canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	2 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 45% of the allotment is in moderately high range condition with a static trend and 55% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition, 40% is impaired and 10% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment but outside the agave bolting and flowering period. (LNB) - Livestock grazing occurs in riparian areas. (JAG) - Recent sight ing of jaguar in or adjacent to National Forest. (JAG) - The presence of suitable CFPO habitat is considered to be unlikely, but habitat assessments have not been made using Arizona Game and Fish Department protocol to confirm the absence of suitable habitat. (CFP)		

Allotment Name	Thurber	**Allotment Number**	236
5th Code Watershed	Cienega Creek	**4th Code Watershed**	Rillito
Allotment Acres **Total Acres** **Capable Range**	 5000 5000	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 2652 1.9
Permitted Use	221 cow/calf; 3/1-2/28	**Projected Use**	221 cow/calf; 3/1-2/28
		Utilization level	35% utilization in growing season, 55% utilization in dormant season
Major Drainage	Empire Gulch	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	16 pasture deferred rotation		
Planned Improvements	- Well: refurbished - Well: new construction - Water storage tank: new - Trough: added as additional water source		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 75% of the allotment is in satisfactory soil condition and 25% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Allotment Name	Calabasas'	**Allotment Number**	216
5th Code Watershed	Middle/Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8975	**Animal Months**	2400
Capable Range	8975	**Acres per animal month**	3.7
Permitted Use	220 cow/calf; 3/1-2/28	**Projected Use**	200 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Calabasas Canyon	**Elevation**	
Major Vegetation type	desert grassland		
Type of grazing system	3 pasture Santa Rita rotation		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 95% of the allotment is in moderately high range condition with a static trend and 5% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition, 40% is impaired and 10% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing in what is thought to be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Mariposa	**Allotment Number**	219
5th Code Watershed	Middle Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	6757	**Animal Months**	2124
Capable Range	6635	**Acres per animal month**	3.1
Permitted Use	236 cow/calf; 9/16-6/15	**Projected Use**	236 cow/calf; 9/16-6/15
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Potrero Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland; desert grassland		
Type of grazing system	5 pasture deferred rotation		
Planned improvements	- Green Tank - construct fence around tank - Little Alamo Tank - construct fence around tank - Twin Tank - construct fence around tank - Punk Tank - construct fence around tank - East Potrero Tank - construct fence around tank - Potrero Trough - reattach to Community well pipeline		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 45% of the allotment is in satisfactory soil condition, 40% is impaired and 15% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Marstellar	**Allotment Number**	218
5th Code Watershed	Lower Santa Cruz/Middle Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	10741	**Animal Months**	3012
Capable Range	9099	**Acres per animal month**	3.0
Permitted Use	247 cow/calf, 3/1-2/28; 4 horses, 3/1-2/28	**Projected Use**	247 cow/calf, 3/1-2/28; 4 horses, 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Calabasas	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	7 pasture deferred rotation		
Planned improvements	- Ruby Road right-of-way fence - construct fence to keep cattle off road - Bull Spring - repair spring box, pipeline and trough - Walker dam - shorten pipeline and replace trough - Pesquiera Tank - reconstruct - Remove 3 existing fences		
Allotment Condition	- The overall trend for the allotment is static. 5% of the allotment is in high range condition with a static trend and 95% is moderately high with a static trend. - Half of the allotment is in satisfactory soil condition and half is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Allotment Name	Murphy	**Allotment Number**	212
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	9386	**Animal Months**	2556
Capable Range	7068	**Acres per animal month**	2.8
Permitted Use	213 cow/calf, 3/1-2/28	**Projected Use**	213 cow/calf, 3/1-2/28
		Utilization Level	55% max utilization during dormant season
Major Drainage	none	**Elevation**	
Major Vegetation type	broadleaf woodland; desert grassland		
Type of grazing system	10 pasture high intensity/ short duration		
Planned improvements	- Fresno spring pipeline - construct 0.25 miles - Camp Loco division fence - new construction		
Allotment Condition	- The overall trend for the allotment is static. 55% of the allotment is in moderately high range condition with a static trend and 45% is moderately low with a static trend. - 60% of the allotment is in satisfactory soil condition and 40% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when agaves are producing flower stalks. (LNB) - Utilization exceeds 45%. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) - Livestock grazing occurs and watershed and riparian conditions are unsatisfactory. (APF) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Nogales Ranger District

Tumacacori EMA - long term

Allotment Name	Peña Blanca	**Allotment Number**	215
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	

Total Acres	11459	Animal Months	1320
Capable Range	7444	Acres per animal month	5.6
Permitted Use	110 cow/calf; 3/1-2/28	Projected Use	110 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Peña Blanca Canyon	Elevation	
Major Vegetation type	broadleaf woodland		
Type of grazing system	4 pasture deferred rotation		
Planned improvements	Amado division fence - new construction		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately high range condition with a static trend. - 60% of allotment in satisfactory soil condition, 30% impaired, 10% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when agaves are producing flower stalks. (LNB) - Livestock grazing in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG, BAE) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs but disturbing activities are excluded within 900 meters of nest site during breeding season. (APF)		

Allotment Name	Ramanote	Allotment Number	214
5th Code Watershed	Lower Santa Cruz/Rio Altar	4th Code Watershed	Upper Santa Cruz/Rio Altar
Allotment Acres		Projected Stocking Rate	
Total Acres	16833	Animal Months	3972
Capable Range	11451	Acres per animal month	2.9
Permitted Use	331 cow/calf; 3/1-2/28	Projected Use	331 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Peck Canyon	Elevation	
Major Vegetation type	broadleaf woodland; desert grassland		
Type of grazing system	13 pasture rotation		
Planned improvements	- Mountain division fence - new construction - Ramanote division fence - new construction		
Allotment Condition	- The overall trend for the allotment is static. 60% of the allotment is in moderately high range condition with a static trend and 40% is moderately low with a static trend. - 55% of the allotment is in satisfactory soil condition and 45% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what is thought to be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) - Livestock grazing occurs and watershed and riparian conditions are unsatisfactory. (APF) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG) - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Nogales Ranger District

Tumacacori EMA - long term

Allotment Name	Rock Corral	Allotment Number	211
5th Code Watershed	Lower Santa Cruz	4th Code Watershed	Upper Santa Cruz
Allotment Acres		Projected Stocking Rate	
Total Acres	5552	Animal Months	684

Capable Range	3023	**Acres per animal month**	4.4
Permitted Use	57 cow/calf; 3/1-2/28	**Projected Use**	100 cow/calf; 12/1-5/31
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Rock Corral	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	3 pasture deferred rotation with state and private land		
Planned improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 55% of the allotment is in moderately high range condition with a static trend and 45% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition and 50% is impaired.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Allotment Name	Sopori	**Allotment Number**	210
5th Code Watershed	Lower Santa Cruz	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	20682	**Animal Months**	4176
Capable Range	16219	**Acres per animal month**	3.9
Permitted Use	300 cow/calf, 3/1-2/28; 48 cow/calf, 3/1-2/28; private land permit	**Projected Use**	300 cow/calf, 3/1-2/28; 48 cow/calf, 3/1-2/28; private land permit
		Utilization Level	35% utilization during growing season, 45% utilization in dormant season
Major Drainage	Sardina, Moyza and Puerto Canyons	**Elevation**	
Major Vegetation type	desert grassland		
Type of grazing system	5 pasture deferred rotation		
Planned improvements	- Aliso/Puerto division fence - new construction - Gravel pasture fence - reconstruction		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in high range condition with a static trend and 75% is moderately high with a static trend. - 50% of allotment in satisfactory soil condition, 30% impaired, 10% unsatisfactory, 10% unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas containing agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in what may be suitable habitat at levels in excess of 30%. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (JAG) - Recent sighting of jaguar in or adjacent to National Forest. (JAG)		

Sierra Vista Ranger District | Huachuca EMA - long term

Allotment Name	Lone Mountain/Parker Canyon	**Allotment Number**	326/335
5th Code Watershed	Upper San Pedro/Upper Santa Cruz	**6th Code Watershed**	Upper San Pedro/Upper Santa Cruz
Allotment Acres		**Projected Stocking Rate**	
Total Acres	38140	**Animal Months**	11400
Capable Range	31840	**Acres per animal month**	2.8
Permitted Use	1346 cow/calf; 3/1-2/28 20 cow/calf; 3/1-2/28,private land permit 32 horses; 3/1-2/28, private land permit	**Projected Use**	950 cow/calf; 3/1-2/28 20 cow/calf; 3/1-2/28,private land permit 32 horses; 3/1-2/28, private land permit
		Utilization Level	45% max utilization (35% in MSO PACs)
Major Drainage	Copper, Sunnyside, Cave, Bear, Lone Mtn, Bodie, Scotia and Parker Canyons	**Elevation**	4800-9450
Major Vegetation type	broadleaf woodland		
Type of grazing system	27 pasture best pasture, deferred rotation		
Planned Improvements	- Wakefield exclosure fence, 2 mi. construction - Scotia exclosure fence, 1.75 mi. construction - Parker riparian pasture fence, 2.5 mi. construction - West Pasture division fence, 1.75 mi. construction - Bury or replace existing water lines, 2 mi. - Peterson pond, reconstruct - Scotia well, reconstruct - Forest boundary fence, 5 mi. reconstruction - South Pasture division fence, 1.5 mi. construction - Airport Mill waterlot, 0.5 mi. construction - Eighty Pasture trap, 0.75 mi. construction		
Allotment Condition	- The overall trend for the allotment is upward. 75% of the allotment is in moderately high range condition with an upward trend, 15% is moderately low with an upward trend and 10% is moderately low with a static trend. - 60% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock grazing occurs in occupied habitat. (HWU) - Livestock use tanks with salamanders or within the range of the salamander. (STS) **NLAA** - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF) - Livestock grazing occurs within potential habitat and/or adjacent to habitat where falcons have been observed in recent years. (NAF)		

Sierra Vista Ranger District | Huachuca EMA - long term

Allotment Name	San Rafael	**Allotment Number**	338
5th Code Watershed	Sonoita Creek & Upper Santa Cruz River	**4th Code Watershed**	Upper Santa Cruz
Allotment Acres **Total Acres** **Capable Range**	 22220 21446	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 5780 3.7
Permitted Use	475 cow/calf; 3/1-2/28	**Projected Use**	475 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization
Major Drainage	Redrock Canyon & Meadow Valley	**Elevation**	4600 to 6170 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	6 herd, 23 pasture deferred rotation with private land		
Planned Improvements	- Conversion of Cott Tank Exclosure fence from electric to barbed wire and possible extension. 4.5 miles. This may also entail addition of another water source.		
Allotment Condition	- The overall trend for the allotment is downward. 70% of the allotment is in moderately low range condition with a downward trend and 30% is low with a downward trend. - 15% is in satisfactory soil condition, 50% is impaired and 35% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas with agaves when they are producing flower stalks. (LNB) - Livestock grazing occurs within 4 miles of a known roost. (LNB) - Livestock grazing occurs in occupied and potential habitat. (GIM) - Livestock use tanks occupied by salamander or within range of the salamander. (STS) **NLAA** - Livestock grazing occurs on open grassland mesas and there were historic prairie dog towns in the EMA. (BFF) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Safford Ranger District | Galiuro EMA - long term

Allotment Name	Bass Canyon	**Allotment Number**	438
5th Code Watershed	Willcox Playa, Lower San Pedro	**4th Code Watershed**	Willcox Playa, Lower San Pedro
Allotment Acres **Total Acres** **Capable Range**	 4458 1303	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 750 1.7
Permitted Use	125 cow/calf; 11/1-4/30	**Projected Use**	125 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization
Major Drainage	Bass Canyon	**Elevation**	5000 to 7000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is downward. All of the allotment is in moderately high range condition with a downward trend. - 30% of the allotment is in satisfactory soil condition and 70% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves for the first 2 weeks of the time when agaves are producing flower stalks and there is a limited amount of capable range. (LNB) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District Galiuro EMA - long term

Allotment Name	Bayless	**Allotment Number**	440
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres **Total Acres** **Capable Range**	 1477 90	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 60 1.5
Permitted Use	20 cow/calf; 3/1-2/28	**Projected Use**	20 cow/calf; 3/1-2/28
		Utilization Level	25% max utilization
Major Drainage	none	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 30% of the allotment is in high range condition with an upward trend and 70% is moderately high with an upward trend. - 5% of the allotment is in satisfactory soil condition and 95% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves but at very low levels and a very small portion of the allotment is capable range. (LNB) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Harrison Canyon	**Allotment Number**	432
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres **Total Acres** **Capable Range**	 2380 1347	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 420 3.2
Permitted Use	35 cow/calf; 3/1-2/28	**Projected Use**	35 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Harrison Canyon	**Elevation**	
Major Vegetation type	desert grassland; coniferous woodland		
Type of grazing system	8 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 25% of the allotment is in moderately high range condition with an upward trend and 75% is moderately high with a static trend. - 60% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 20% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District | Galiuro EMA - long term

Allotment Name	High Creek	**Allotment Number**	433
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3380	**Animal Months**	300
Capable Range	1041	**Acres per animal month**	3.5
Permitted Use	25 cow/calf; 3/1-2/28	**Projected Use**	25 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	High Creek	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	2 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 10% of the allotment is in high range condition with an upward trend and 90% is moderately high with an upward trend. - 40% of the allotment is in satisfactory soil condition, 10% is unsatisfactory and 50% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (BAE) - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	North Ash Creek	**Allotment Number**	435
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	1272	**Animal Months**	180
Capable Range	943	**Acres per animal month**	5.3
Permitted Use	15 cow/calf; 3/1-2/28	**Projected Use**	15 cow/calf; 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	North Ash Creek	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in high range condition with an upward trend. - 35% of the allotment is in satisfactory soil condition, 35% is unsatisfactory and 30% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District | Galiuro EMA - long term

Allotment Name	San Pedro	**Allotment Number**	441
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	5181	**Animal Months**	240
Capable Range	492	**Acres per animal month**	2.0
Permitted Use	40 cow/calf; 3/1-2/28	**Projected Use**	40 cow/calf; 3/1-2/28
		Utilization Level	40% max utilization
Major Drainage	Keilberg Canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	3 pasture rest rotation with private land		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 10% of the allotment is in satisfactory soil condition and 90% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks but there is a limited amount of capable range. (LNB) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Sombrero Butte	**Allotment Number**	443
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4221	**Animal Months**	228
Capable Range	749	**Acres per animal month**	3.3
Permitted Use	75 cow/calf; 3/1-2/28	**Projected Use**	75 cow/calf; 10/1-6/30
		Utilization Level	40% max utilization
Major Drainage	none	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 40% of the allotment is in moderately high range condition with an upward trend and 60% is moderately low with an upward trend. - 40% of the allotment is in satisfactory soil condition, 5% is impaired, 40% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District — Galiuro EMA - long term

Allotment Name	South Ash	**Allotment Number**	436
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox Playa
Allotment Acres **Total Acres** **Capable Range**	 5274 1612	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	
Permitted Use	45 cow/calf; 11/1-6/30	**Projected Use**	20 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	South Ash Creek, Bear Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	3 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 5% of the allotment is in high range condition with an upward trend and 95% is moderately high with an upward trend. - 35% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 50% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Wear	**Allotment Number**	437
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres **Total Acres** **Capable Range**	 2886 2225	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 840 2.7
Permitted Use	58 cow/calf 3/1-2/28; 12 cow/calf 3/1-2/28 private land permit	**Projected Use**	58 cow/calf 3/1-2/28; 12 cow/calf 3/1-2/28 private land permit
		Utilization Level	45% max utilization
Major Drainage	none	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	4 pasture rest rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 95% of the allotment is in moderately high range condition with an upward trend and 5% is moderately low with an upward trend. - 60% of the allotment is in satisfactory soil condition, 10% is impaired, 25% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District — Pinaleno EMA - long term

Allotment Name	Bonita	**Allotment Number**	424
5th Code Watershed	Willcox Playa Basin	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	8742	**Animal Months**	960
Capable Range	3376	**Acres per animal month**	3.5
Permitted Use	160 cow/calf; 11/10-5/10	**Projected Use**	160 cow/calf; 11/10-5/10
		Utilization Level	50% max utilization
Major Drainage	Goudy Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 45% of the allotment is in moderately high range condition with an upward trend, 35% is moderately high with a static trend, 10% is moderately low with an upward trend and 10% is low with an upward trend. - 45% of the allotment is in satisfactory soil condition, 25% is unsatisfactory and 30% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District — Pinaleno EMA - long term

Allotment Name	Cedar Springs	**Allotment Number**	409
5th Code Watershed	Aravaipa, Lower Gila	**4th Code Watershed**	Lower San Pedro/Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4904	**Animal Months**	750
Capable Range	4171	**Acres per animal month**	5.6
Permitted Use	150 cow/calf 11/1-3/31	**Projected Use**	150 cow/calf 11/1-3/31
		Utilization Level	50% max utilization on the uplands and 40% in the riparian areas
Major Drainage	Little Cottonwood Canyon & Linsey Canyon	**Elevation**	4500 to 6700 feet
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	1 pasture, rotated with Two Troughs Allotment		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 35% of the allotment is in moderately high range condition with an upward trend and 65% is moderately low with an upward trend. - 35% of the allotment is in satisfactory soil condition and 65% is unsatisfactory.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF)		

Safford Ranger District | Pinaleno EMA - long term

Allotment Name	Gillman	**Allotment Number**	420
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4953	**Animal Months**	1200
Capable Range	4604	**Acres per animal month**	3.8
Permitted Use	240 cow/calf; 11/1-3/31	**Projected Use**	240 cow/calf; 11/1-3/31
		Utilization Level	50% max use in the uplands and 40% in the riparian areas
Major Drainage	Gillman Canyon	**Elevation**	
Major Vegetation type	southwestern desertscrub		
Type of grazing system	2 pasture rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 95% of the allotment is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	O Bar O	**Allotment Number**	419
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	16338	**Animal Months**	2502
Capable Range	11158	**Acres per animal month**	4.5
Permitted Use	417 cow/calf; 11/1-4/30	**Projected Use**	417 cow/calf; 11/1-4/30
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	Big Creek; Grapevine Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland; southwestern desertscrub		
Type of grazing system	6 pasture Holistic Resource Management		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 30% of the allotment is in moderately high range condition with an upward trend, 60% is moderately high with a static trend and 10% is moderately low with a downward trend. - 35% of the allotment is in satisfactory soil condition, 50% is unsatisfactory and 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District

Pinaleno EMA - long term

Allotment Name	Seventy Six	**Allotment Number**	412
5th Code Watershed	Aravaipa Creek	**4th Code Watershed**	Lower San Pedro
Allotment Acres **Total Acres** **Capable Range**	 13829 8683	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1425 6.1
Permitted Use	285 cow/calf; 11/1-3/31	**Projected Use**	285 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	KH Canyon; Durkee Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland; coniferous forest		
Type of grazing system	1 pasture season long		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 70% of the allotment is in moderately high range condition with an upward trend, 20% is moderately low with an upward trend and 10% is moderately low with a downward trend. - 35% of the allotment is in satisfactory soil condition, 45% is impaired, 10% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Stockton Pass	**Allotment Number**	418
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres **Total Acres** **Capable Range**	 25162 18595	**Projected Stocking Rate** **Animal Months** **Acres per animal month**	 1740 10.7
Permitted Use	145 cow/calf; 3/1-2/28	**Projected Use**	145 cow/calf; 3/1-2/28
		Utilization Level	45% max utilization in uplands and 40% in riparian areas
Major Drainage	Stockton Pass Wash, Gillespie, Oak Draw	**Elevation**	
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	9 pasture high intensity, short duration		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 60% of the allotment is in moderately high range condition with an upward trend and 40% is moderately high with a static trend. - 60% of the allotment is in satisfactory soil condition, 15% is impaired, 15% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO)		

Safford Ranger District — Pinaleno EMA - long term

Allotment Name	Two Troughs	**Allotment Number**	410
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3774	**Animal Months**	750
Capable Range	3261	**Acres per animal month**	4.3
Permitted Use	100 cow/calf; 1/1-3/31	**Projected Use**	250 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization in uplands and 40% in riparian areas
Major Drainage	Two Troughs Canyon	**Elevation**	
Major Vegetation type	desert grassland; broadleaf woodland		
Type of grazing system	1 pasture rotated with Cedar Spring Allotment		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - 35% of the allotment is in satisfactory soil condition, 60% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District — Santa Teresa EMA - long term

Allotment Name	Black Rock	**Allotment Number**	404
5th Code Watershed	Lower Gila	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	13844	**Animal Months**	693
Capable Range	3436	**Acres per animal month**	5.0
Permitted Use	66 cow/calf; 3/1-2/28	**Projected Use**	66 cow/calf; 3/1-2/28
		Utilization Level	40% max utilization
Major Drainage	Black Rock Canyon	**Elevation**	
Major Vegetation type	chaparral; broadleaf woodland		
Type of grazing system	2 pasture Santa Rita rotation		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. 30% of the allotment is in moderately high range condition with an upward trend, 65% is moderately high with a static trend and 5% is moderately low with an upward trend. - Half of the allotment is in satisfactory soil condition and half is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District | Pinaleno EMA - long term

Allotment Name	Foster	**Allotment Number**	406
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3671	**Animal Months**	300
Capable Range	697	**Acres per animal month**	2.3
Permitted Use	30 cow/calf 11/1-4/30; 10 cow/calf 3/1-2/28 on/off	**Projected Use**	30 cow/calf 11/1-4/30; 10 cow/calf 3/1-2/28 on/off
		Utilization Level	50% max utilization
Major Drainage	Dark Canyon	**Elevation**	
Major Vegetation type	chaparral		
Type of grazing system	1 pasture winter use or year long on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 85% of the allotment is in moderately high range condition with an upward trend and 15% is moderately low with a static trend. - 50% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 30% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves for the first 2 weeks of the time when agaves are producing flower stalks and there is a limited amount of capable range. (LNB)		

Allotment Name	VJ	**Allotment Number**	407
5th Code Watershed	Lower Gila River	**4th Code Watershed**	Upper Gila River
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4461	**Animal Months**	250
Capable Range	1102	**Acres per animal month**	4.4
Permitted Use	50 cow/calf; 11/1-3/31	**Projected Use**	50 cow/calf; 11/1-3/31
		Utilization Level	50% max utilization in the uplands and 40% in riparian areas
Major Drainage	Cottonwood Canyon	**Elevation**	
Major Vegetation type	chaparral		
Type of grazing system	1 pasture winter use		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 95% of the allotment is in moderately high range condition with an upward trend and 5% is moderately low with a static trend. - 45% of the allotment is in satisfactory soil condition, 30% is unsatisfactory and 25% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time when agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB)		

Safford Ranger District | Winchester EMA - long term

Allotment Name	Riley Peak	**Allotment Number**	446
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	4284	**Animal Months**	720
Capable Range	499	**Acres per animal month**	0.7
Permitted Use	20 cow/calf 11/1-4/30; 50 cow/calf 3/1-2/28 on/off	**Projected Use**	20 cow/calf 11/1-4/30; 50 cow/calf 3/1-2/28 on/off
		Utilization Level	50% max utilization
Major Drainage	Mud Springs & Rose Canyon	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. All of the allotment is in moderately high range condition with an upward trend. - All of the allotment is in satisfactory soil condition.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Rockhouse	**Allotment Number**	445
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	7209	**Animal Months**	1800
Capable Range	3324	**Acres per animal month**	1.8
Permitted Use	150 cow/calf 3/1-2/28	**Projected Use**	150 cow/calf 3/1-2/28
		Utilization Level	50% max utilization
Major Drainage	Rockhouse Canyon	**Elevation**	
Major Vegetation type	coniferous woodland		
Type of grazing system	one pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is upward. 5% of the allotment is in high range condition with a static trend and 95% is moderately high with an upward trend. - 75% of the allotment is in satisfactory soil condition, 20% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves during the time agaves are producing flower stalks. (LNB) - Utilization levels exceed 45%. (LNB) **NLAA** - Livestock grazing occurs within PAC or within MSO habitat. (MSO) - Livestock grazing occurs in occupied habitat, suitable unsurveyed or potential habitat. (NAF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Safford Ranger District — Winchester EMA - long term

Allotment Name	Rocky	**Allotment Number**	449
5th Code Watershed	Willcox Playa	**4th Code Watershed**	Willcox
Allotment Acres		**Projected Stocking Rate**	
Total Acres	660	**Animal Months**	108
Capable Range	362	**Acres per animal month**	3.4
Permitted Use	9 cow/calf; 3/1-2/28	**Projected Use**	9 cow/calf; 3/1-2/28
		Utilization Level	30% max utilization
Major Drainage	none	**Elevation**	
Major Vegetation type	broadleaf woodland		
Type of grazing system	1 pasture on/off		
Planned Improvements	None		
Allotment Condition	- The overall trend for the allotment is static. All of the allotment is in moderately low range condition with a static trend. - 45% of the allotment is in satisfactory soil condition, 15% is impaired and 40% is unsatisfactory.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs on the allotment during the agave flowering and bolting season but vegetation types do not support high densities of agaves. (LNB)		

Santa Catalina Ranger District — Santa Catalina EMA - long term

Allotment Name	Barney	**Allotment Number**	517
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	3377	**Animal Months**	780
Capable Range	925	**Acres per animal month**	1.2
Permitted Use	65 cow/calf; 3/1-2/28	**Projected Use**	65 cow/calf; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Sycamore & Deer Creek	**Elevation**	4,000 to 6,000 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	2 pasture season long		
Planned Improvements	None		
Allotment Condition	- 20% of the allotment is in moderately high range condition and 80% is moderately low (1993). - 70% of the allotment is in satisfactory soil condition, 15% is unsatisfactory and 15% is unsuited (1995).		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in riparian areas. (SWF) - Livestock grazing occurs on the allotment during the time when agaves are producing flower stalks but not in vegetation types that contain many agaves. (LNB) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Santa Catalina Ranger District Santa Catalina EMA - long term

Allotment Name	Happy Valley	**Allotment Number**	518
5th Code Watershed	Lower San Pedro	**4th Code Watershed**	Lower San Pedro
Allotment Acres		**Projected Stocking Rate**	
Total Acres	11901	**Animal Months**	1980
Capable Range	8646	**Acres per animal month**	4.2
Permitted Use	140 cow/calf; 3/1-2/28 6 horses; 3/1-2/28	**Projected Use**	165 cow/calf; 3/1-2/28 6 horses; 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Paige, Turkey & Miller Creeks	**Elevation**	4,000 to 8,500 feet
Major Vegetation type	broadleaf woodland		
Type of grazing system	4 pasture rest rotation with state land		
Planned Improvements	None		
Allotment Condition	- 20% of the allotment is in high range condition, 55% is moderately high and 25% is moderately low (1995). - 35% of the allotment is in satisfactory soil condition, 40% is impaired, 20% is unsatisfactory and 5% is unsuited (1995).		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (SWF = southwestern willow flycatcher) - Livestock grazing occurs at levels in excess of 30% in areas thought to be suitable habitat but there is limited acreage below 4,000 feet. (CFP) - Livestock grazing occurs within 3,400 meters of a nest site and disturbing activities do not occur during the breeding season within 900 meters of a nest site. (APF)		

Allotment Name	Redington Pass	**Allotment Number**	504
5th Code Watershed	Rillito	**4th Code Watershed**	Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	20783	**Animal Months**	3480
Capable Range	17587	**Acres per animal month**	5.0
Permitted Use	290 cow/calf 3/1-2/28; 4 horses 3/1-2/28	**Projected Use**	290 cow/calf 3/1-2/28; 4 horses 3/1-2/28
		Utilization level	45% max utilization
Major Drainage	Tanque Verde & Agua Caliente	**Elevation**	2,840 to 6,200 feet
Major Vegetation type	southwestern desertscrub		
Type of grazing system	3 pasture rest rotation		
Planned Improvements	None		
Allotment Condition	- 10% of the allotment is in high range condition, 75% is moderately high and 15% is moderately low (1992). - 10% of the allotment is in satisfactory soil condition, 75% is unsatisfactory, 15% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing in areas with agaves when agaves are producing flower stalks. (LNB) - Livestock grazing occurs in excess of 30% in areas thought to be suitable habitat. (CFP) - Livestock gathering occurs in what is thought to be unsurveyed suitable habitat between January 1 and June 30. (CFP) **NLAA** - Livestock grazing occurs in riparian areas. (SWF) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Rincon/Agua Verde	**Allotment Number**	522/524
5th Code Watershed	Rillito, Cienega	**4th Code Watershed**	Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	12000	**Animal Months**	1824
Capable Range	9710	**Acres per animal month**	5.3
Permitted Use	152 cow/calf 3/1-2/28	**Projected Use**	152 cow/calf 3/1-2/28
		Utilization level	45% max utilization; 30% max utilization below 4000'
Major Drainage	Shaw, Chimney & Distillery Canyons; Posta Quemada	**Elevation**	3,500 to 7,800 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	4 pasture rotation		
Planned Improvements	- Corral - Stock trail		
Allotment Condition	- 35% of the allotment is in moderately high range condition, 40% is moderately low and 25% is low (1977, 1994). - 65% of the allotment is in satisfactory soil condition, 15% is impaired, 15% is unsatisfactory and 5% is unsuited.		
Management Actions that contribute to effects	**LAA** - Livestock grazing occurs in areas containing agaves at the time agaves are producing flower stalks. (LNB) **NLAA** - Livestock grazing occurs in riparian areas. (SWF) - Utilization level is 30% below 4,000 feet in elevation. (CFP) - Livestock gathering activities are prohibited within 0.25 miles of detection site or unsurveyed habitat between January 1 and June 30. (CFP) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

Allotment Name	Rock Pile	**Allotment Number**	523
5th Code Watershed	Cienega	**4th Code Watershed**	Rillito
Allotment Acres		**Projected Stocking Rate**	
Total Acres	2170	**Animal Months**	150
Capable Range	1630	**Acres per animal month**	10.9
Permitted Use	25 cow/calf; 10/1-3/31	**Projected Use**	25 cow/calf 10/1-3/31
		Utilization level	45% max utilization
Major Drainage	Agua Verde Creek	**Elevation**	4,250 to 7,044 feet
Major Vegetation type	southwestern desertscrub; broadleaf woodland		
Type of grazing system	3 pasture		
Planned Improvements	None		
Allotment Condition	- 15% of the allotment is in high range condition, 50% is moderately high, and 35% is moderately low (1994). - 15% of the allotment is in satisfactory soil condition, 35% is impaired, 40% is unsatisfactory and 10% is unsuited.		
Management Actions that contribute to effects	**NLAA** - Livestock grazing occurs in areas containing agaves but not during the time when agaves are producing flower stalks. (LNB) - Livestock grazing occurs but is not hindering improvement of watershed or riparian condition. (APF)		

EFFECTS OF THE ACTION

A large body of research and literature exists on the effects of livestock grazing, positive, negative, or neutral, on numerous parts of many ecosystems and can be found in several bibliographies (Ffolliott et al. no date, Willoughby 1997, Southwest Center for Biological Diversity 1995, 1999, Burgess 1999, Forest Guardians 1999). The following section identifies some of the general effects that livestock grazing has on ecosystems, habitat types, and species groups. Livestock grazing effects to specific species will be discussed in the appropriate section.

The extensive and intensive effects of livestock grazing on soil and vegetation have been documented many times in many areas. All grazing, including that of domestic livestock, can alter vegetation composition, structure, and biomass; cause soil erosion and compaction, reduce water infiltration rates, and increase runoff (Klemmedson 1956, Ellison 1960, Arndt 1966, Gifford and Hawkins 1978, Webb and Stielstra 1979, Guthery et al. 1990, Orodho et al. 1990). Livestock grazing effects to native southwestern fishes and their habitats have been long recognized (Chamberlain 1904, Miller 1961, Hendrickson and Minckley 1984, Minckley et al. 1991b).

Direct Effects

Livestock may graze plants that are either listed, forage for listed species, or provide cover or protection for listed species. Grazing can also affect the vegetative community and ecosystem functioning (Shreve 1931, Niering et al. 1963, Shelton 1985, Abouholder 1992, USFWS 1997a, 1999). Physical damage to Arizona hedgehog cactus (*Echinocereus triglochidatus* var. *arizonicus*) from livestock has been noted (USFS 1996).

Livestock may directly affect fish through trampling or ingestion of adults, larvae, or eggs (Roberts and White 1992). Trampling of adult fish is probably rare, except in localized situations, or with smaller fish such as Gila topminnow. Livestock waste is potentially poisonous to some fish (Cross 1971, Taylor et al. 1991).

Indirect Effects

Livestock grazing alters the species composition of communities, disrupts ecosystem functioning, and alters ecosystem structure (Fleischner 1994). The main direct impacts from cattle are the grazing of plants and trampling of vegetation and soil (Marlow and Pogacnik 1985). These impacts can affect both riparian zones and uplands.

Some grasses are adapted to respond to grazing because growth originates at the basal meristem, close to the soil surface. Plants may regenerate quickly if the root crown is not damaged, and if sufficient photosynthesis has taken place to provide for root development and annual replacement. In fact, light or moderate grazing may stimulate growth in some plants (Ellison 1960), because removal of plant material containing carbohydrate reserves may increase photosynthetic activity to replace the lost material (Humphrey 1958). However, a review of the effects of herbivory on grazed plants conducted by Belsky (1986), illustrated there is little evidence to show that grazing benefits plants. Other authors, including Ellison (1960), have reached the same conclusion (Jameson 1963, Silvertown 1982).

Grazing can alter the prey availability of certain predators by removing herbaceous vegetation which serves as food and cover for small mammals (Ward and Block 1995). Grazing can also alter fire regimes, which may have positive or negative effects to listed species, but generally is deleterious to ecosystem functioning.

Reductions in vegetation cover increases raindrop impact, decreases soil organic matter and soil aggregates, and decreases infiltration rates (Blackburn 1984, Orodho et al. 1990). Other detrimental impacts include increased overland flow, reduced soil water content, and increased erosion (DeBano and Schmidt 1989a, Guthery et al. 1990, Orodho et al. 1990). Continuous year-long grazing can result in large bare areas around water sources and creation of established trails to and from points of livestock concentrations (Platts 1990).

Watershed condition and function can be affected by impacts to vegetation and litter from livestock grazing (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989a, Belnap 1992, Belsky and Blumenthal 1997). Heavy grazing effects are well known and can be severe (Guthery et al. 1990, Platts 1990). Conflicting information exists about the effects of more moderate grazing schemes (Gifford and Hawkins 1979, Blackburn 1984). Studies by Dadkhah and Gifford (1980) in the western United States show trampling by livestock causes a decline in infiltration rates, but regardless of trampling, sediment yields remain uniform after grass cover reaches 50 percent.

A system which provides ample rest periods and grazing deferments, should improve plant vigor, herbage production, and slowly over time, change the species composition to more desirable species (Hormay 1970, Hughes 1979, Van Poolen and Lacey 1979). The time required and the amount of change expected will vary from site to site depending on the site potential of the particular range site and present trends and the grazing levels. The lighter the grazing, the quicker the recovery. Riparian vegetation tends to rebound quickly with rest or less grazing (Platts and Nelson 1985b, Elmore and Beschta 1987, Schulz and Leininger 1990).

Watershed function is an important factor in maintaining stream function (Platts 1986, Meehan 1991, Chaney et al. 1993) and is extremely important to cienegas which are sensitive to flood disturbance (Hendrickson and Minckley 1984). The riparian vegetation and streambank riparian condition in tributaries, including intermittent and ephemeral ones, form essential screens between upland effects and perennial streams (Erman et al. 1977, Mahoney and Erman 1981, Osborne and Kovacic 1993).

Livestock grazing in riparian areas can cause changes in plant species composition (Ryder 1980, Schulz and Leininger 1991, Stromberg 1993a), reduce structural complexity (Ohmart and Anderson 1986), reduce understory, and replace native species with nonnative species (Krueper 1995). Greater soil erosion and compaction, changed flooding regimes, and decreased water quality also results from livestock presence in riparian areas (Lusby et al. 1971, Lusby 1979, DeBano and Schmidt 1989b, Szaro 1989, Armour et al, 1991, Platts 1991, Fleischner 1994). Cattle disrupt streambanks through chiseling, sloughing, compaction, and collapse. This in turn can lead to wider and shallower stream channels (Armour 1977, Platts and Nelson 1985b, Platts 1990, Meehan 1991). These changes in channel morphology will affect fish habitat elements (Bovee 1982, Rosgen 1994). Livestock damage to riparian and aquatic zones occurs shortly after livestock entry into the area and occurs at all levels of use (Marlow and Pogacnik 1985, Platts and Nelson 1985a, Goodman et al. 1989). Even after rest, the recovery of streambanks and vegetation may be halted or lost soon after cattle return (Duff 1979, Platts and Nelson 1985a).

The most commonly acknowledged impact of livestock grazing is increased sediment production and transport (Platts 1990, Johnson 1992, Weltz and Wood 1986). Negative impacts of sediment to fish and fish habitat are well documented (Newcombe and MacDonald 1991, Barrett 1992, Megahan et al. 1992). Gila topminnow and Yaqui chub are not especially sensitive to sediment loads. However, excess sediment may cause the change or loss of habitat used by the fish. Excess sediment can also smother invertebrates, reducing production and availability of fish food. Livestock grazing has also been demonstrated to increase nutrients in streams (Kaufman and Krueger 1984).

ENVIRONMENTAL BASELINE (FOREST-WIDE)

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions that are contemporaneous with the consultation process. The environmental baseline defines the status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

The effects of livestock management on the landscape is related to numerous factors (Holechek et al. 1998). Environmental parameters such as precipitation, temperature regimes, and growing season provide the basics upon which a grazing program is developed (Schmutz 1977). Abiotic factors include soils, climate, geography, and topography. Stocking rates, utilization levels, and rotation patterns comprise livestock management choices. Grazing utilization levels assigned to the various allotments on the Coronado NF generally range from 35 percent to 55 percent for uplands. Utilization levels for riparian areas, when given, are about 10 percent less than the surrounding uplands. These levels are applied widely across EMA's and do not account for site-specific range, watershed, or soil conditions. The amended Forest plan established standards and guidelines for grazing activities which are to apply when site-specific information is lacking. When site-specific information is available, the amendment is considered discretionary and other standards may be developed. The Forest ordinarily uses site-specific information so the standards from the amended plan often do not apply. However, the corollary of having site-specific information is to apply site-specific information in analysis and development of grazing standards. The Forest has applied the maximum utilization limits as provided for within the Forest Plan regardless of the condition of an individual allotment. In addition, the issue of site-specific information within the amended Forest Plan can be extended to the need for information on how grazing practices affect listed species as well as other resources. The amended Forest plan grazing management standard is "Forage use by grazing ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species."

Reviews of grazing literature for southwestern habitats support the need to limit levels of utilization (Martin 1973, 1975, Holechek et al. 1998). Martin and Cable (1974), working on the Santa Rita Experimental Range in southern Arizona, found that perennial grass vigor declined when average utilization for a ten-year period exceeded 40 percent. The numbers used by these researchers represent average utilization rates (Holechek 1999). The averages may cover a whole pasture, and not just one key area, and be for more than one year. The application of average utilization rates to a landscape which is not homogenous is problematic. Also, livestock do not distribute themselves evenly through a pasture, regardless of efforts by the permittee to move them. It is certain that areas will be used much greater than the average, and thus may lead to more localized impacts. The Service is concerned that the grazing management program being implemented by the Forest is not consistent with the intent of the amended Forest plan.

Range condition categories used by the Coronado correspond to standard range terms as follows: high=excellent, moderately high=good, moderately low=fair, low=poor to very poor. Range condition measures similarity to potential natural community. Degraded rangelands are missing plant species that under natural conditions are present, or plant species abundances are altered from natural conditions. The plant species used for determining range condition are ones commonly used by livestock. The Society for Range Management publishes a glossary of range management terms (Range Term Glossary Committee, Society for Range Management, M. M. Kothmann, Chairman 1974).

Soil condition is described as the ability of soil to infiltrate water, resist erosion, and recycle nutrients. Condition classes reflect soil disturbance resulting from a management practice and maintenance of soil productivity. Condition classes are defined as follows (from Appendix D of USFS 1998a):

Satisfactory: Soil condition indicates that the inherent productive capacity of the soil resource is being sustained with respect to soil function. Management practices do not reduce soil function. Proper soil function results in the ability of the soil to maintain resource values and sustain outputs.

Impaired: Soil condition indicates a reduction of the soil's inherent productive capacity with respect to soil function. The ability of the soil to function properly has been reduced. An impaired category should signal land managers that there is a need to evaluate existing management practices, take corrective actions where necessary, and to investigate the ecosystem further to determine the degree and cause in decline in soil function.

Unsatisfactory: Soil condition indicates that degradation exists. A loss of the soil's inherent productivity capacity has occurred. Soil productivity is not being sustained with respect to soil function. A reduction of soil function results in the inability of the soil to maintain resource values and sustain outputs. Soils rated in the unsatisfactory category are a high priority for land managers to evaluate and change management practices.

Unsuited: Soils on slopes greater than 40 percent where current soil loss exceeds the rate of soil loss that should occur while sustaining inherent site productivity. These soils are unsuited for cattle use.

The Forest contains 12 distinct geographical units in Arizona and New Mexico (Figure 1). There are 12 Ecosystem Management Areas (EMA's) which correspond to these geographical units. The EMA's also correspond with most of the higher mountain ranges in southeast Arizona and far southwestern New Mexico. These 12 areas cover 728,434 ha (1,800,000 ac). In Arizona, the Forest lies in Pinal, Graham, Pima, Cochise, and Santa Cruz counties. Hidalgo County is the only one in New Mexico the Forest lies within. The Forest is also divided into five Ranger Districts: Douglas, Nogales, Sierra Vista, Safford, and Santa Catalina. There are 200 grazing allotments on the Forest. Of these, three are closed to livestock grazing and 10 are, or were, addressed in other biological opinions.

The 187 grazing allotments included in this consultation encompass 647,497 ha (1,600,000 ac). Of this, 445,154 ha (1,100,000 ac) are capable, or used in determining range capacity. The other 202,343 ha (500,000 ac) are considered unsuitable, generally due to steep or very rocky terrain. Livestock rarely use these areas even though the areas are usually not fenced off from the rest of the allotment.

The Forest Service classifies range condition as low, moderately-low, moderately-high, and high. These classifications are further defined by their trend, as downward, static, or upward. Range condition and trend for the Forest is summarized in Table 1. Much of the area within the 187 allotments is in moderately-high or moderately-low range condition and in a static or upward trend. Soil condition on the Forest is 50 percent satisfactory, 40 percent impaired or unsatisfactory, and 10 percent unsuited (USFS 1998c:D-3).

The vegetation covering the Forest is mostly Sonoran Desert, Madrean woodland, or coniferous forest. There are medium amounts of plains grassland, chaparral, and various riparian types (USFS 1998a:Appendix C).

The Chiricahua EMA covers about 117,000 ha (290,000 ac) and is mostly Madrean woodland, coniferous forest, or desert grassland. There are 81,000 ha (199,000 ac) rated as "capable." All of the EMA is allotted into 32 grazing allotments (Figure 2). Grazing on 25 allotments is

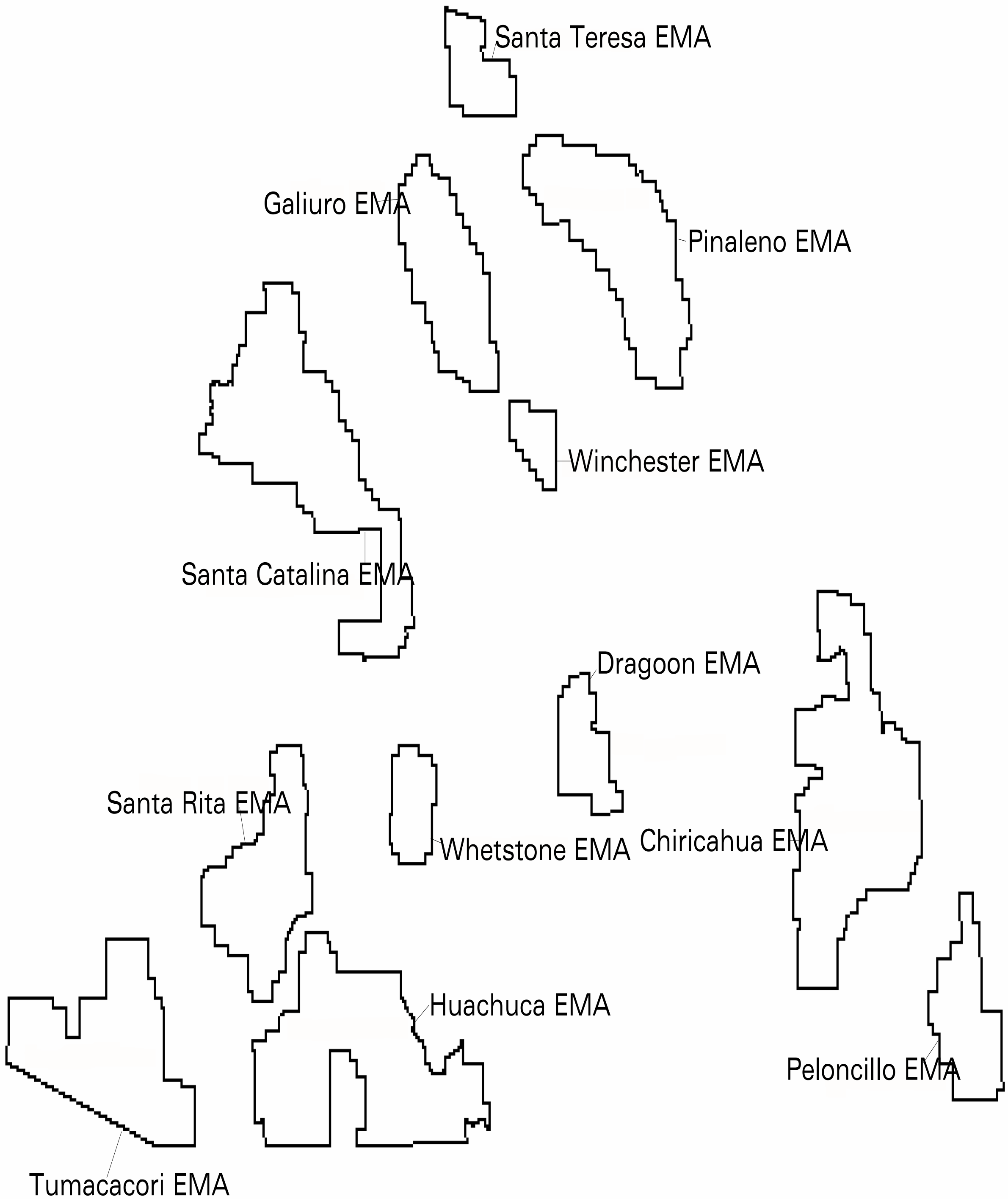

Figure 1.. Ecosystem Management Areas on the Coronado National Forest.

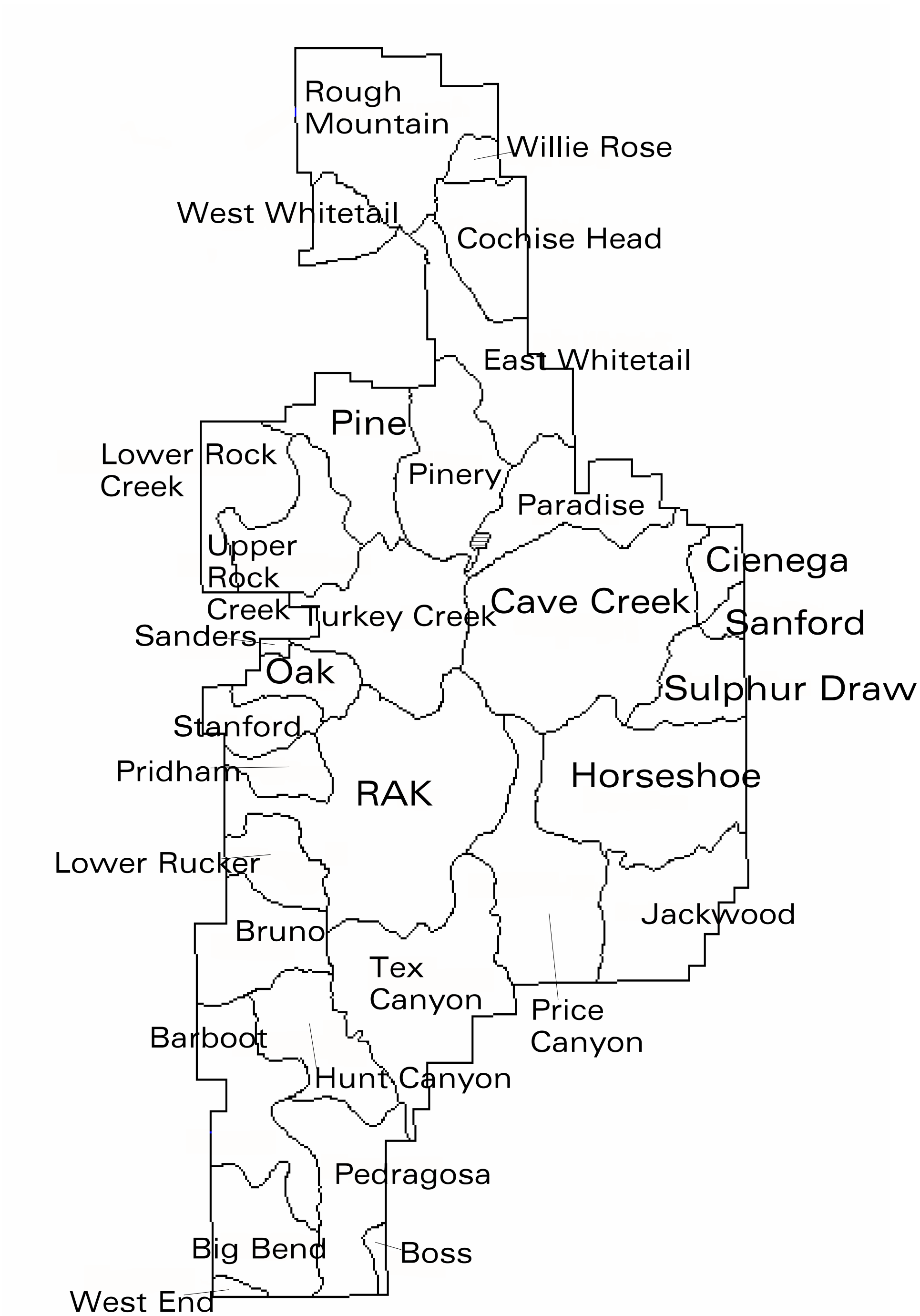

Figure 2. Grazing allotments in the Chiricahua EMA, Coronado National Forest.

Table 1. Range condition and trend in acres on the 187 Coronado National Forest grazing allotments in this consultation. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	7474	26,288	1470	35,232
Moderately-low	79,365	279,704	159,650	518,719
Moderately-high	2467	593,617	398,055	994,139
High	0	56,373	14,878	71,251
Total	89,306	955,982	574,053	1,619,341

Table 2. Range condition and trend in acres on the 27 Chiricahua EMA allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	6101	56,417	89,752	152,270
Moderately-high	0	57,318	18,034	75,352
High	0	53	7829	7882
Total	6101	113,788	115,615	235,504

considered under the short-term part of the proposed action and two are considered under the long-term. Permitted numbers are 5,516 livestock (including some private land) and proposed numbers are 5,540. Proposed numbers are higher than permitted when more livestock are grazed for a shorter time than the maximum time permitted. Permitted Animal Months (AM's) are about 39,000 and proposed are about 34,000. The proposed stocking rate is about 2.35 ha (5.8 ac) per AM. Most of the EMA is in moderately-low or moderately-high range condition in a static or upward trend (Table 2). The maximum vegetation utilization in the uplands ranges from 45 percent to 55 percent and in riparian areas ranges from 40 percent to 45 percent.

The Dragoon EMA covers about 22,000 ha (54,000 ac) and is composed mostly of Madrean woodland, desert grassland, or chaparral. Capable hectares are 11,000 (28,000 ac). Most of the EMA is allotted in 10 grazing allotments (Figure 3). Grazing on seven allotments is considered

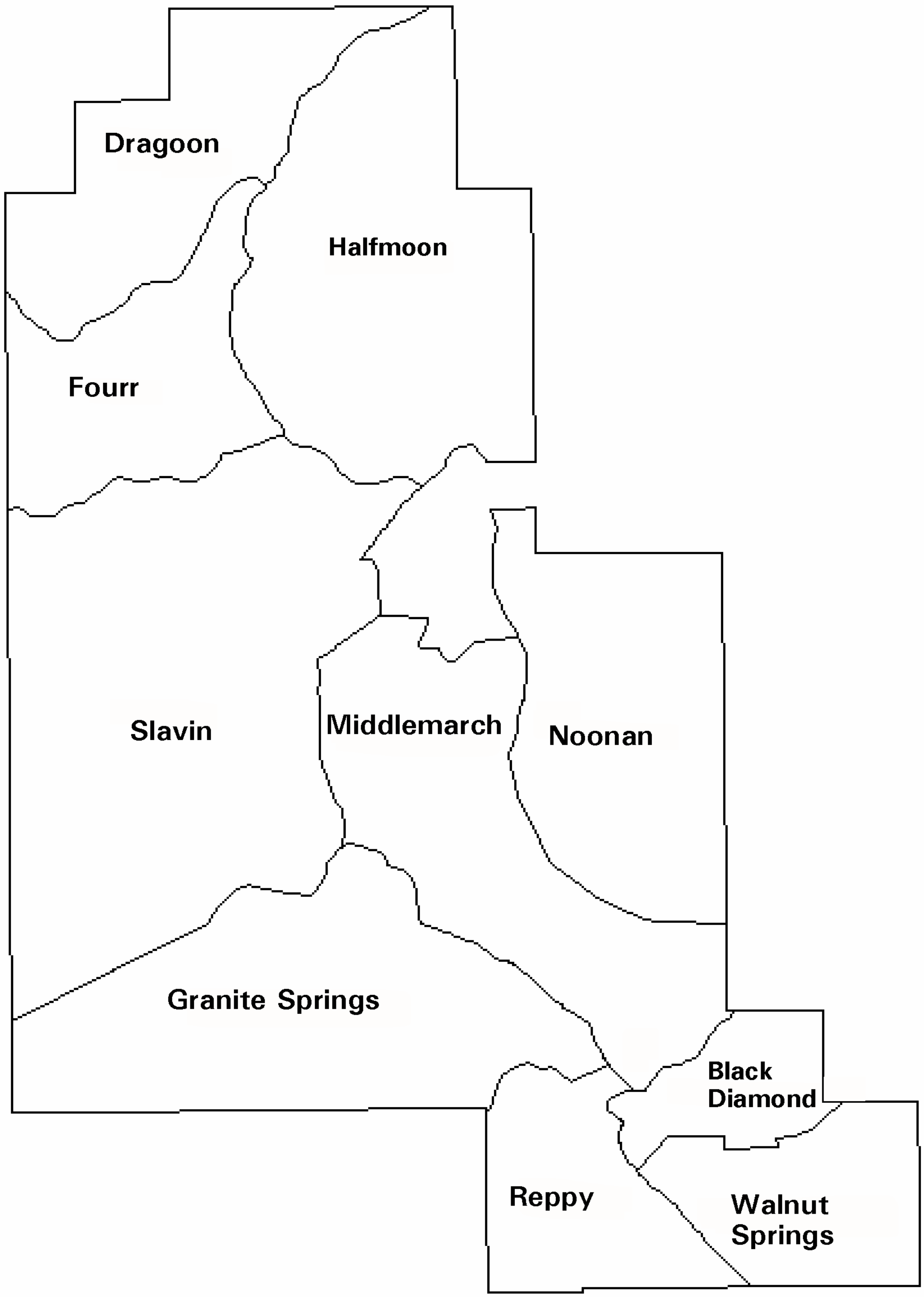

Figure 3. Grazing allotments in the Dragoon EMA, Coronado National Forest.

Table 3. Range condition and trend in acres in eight Dragoon EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	0	2009	6305	8314
Moderately-high	1586	23,999	7245	32,830
High	0	310	1129	1439
Total	1586	26,318	14,679	42,583

Table 4. Range condition and trend in acres in 12 Peloncillo EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	3227	4059	1782	9068
Moderately-high	0	38,645	37,454	76,099
High	0	741	516	1257
Total	3227	43,445	39,752	86,424

under the short-term part of the proposed action and one is under the long-term. Permitted numbers are 774 livestock (including some private land) and proposed numbers are 919. Proposed numbers are higher than permitted numbers when more livestock than permitted are grazed for a shorter time than permitted. Permitted Animal Months are about 7,400 and proposed are about 7,700. The proposed stocking rate is about 2.8 ha (6.9 ac) per AM. Most of the EMA is in moderately-high or moderately-low range condition in a static or upward trend (Table 3). The maximum vegetation utilization in the uplands ranges from 45-55 percent and in riparian areas from 40-45 percent.

The Peloncillo EMA covers about 36,000 ha (88,000 ac) in Arizona and New Mexico. The vegetation is mostly Madrean woodland, desert grassland, or chaparral. Capable hectares are

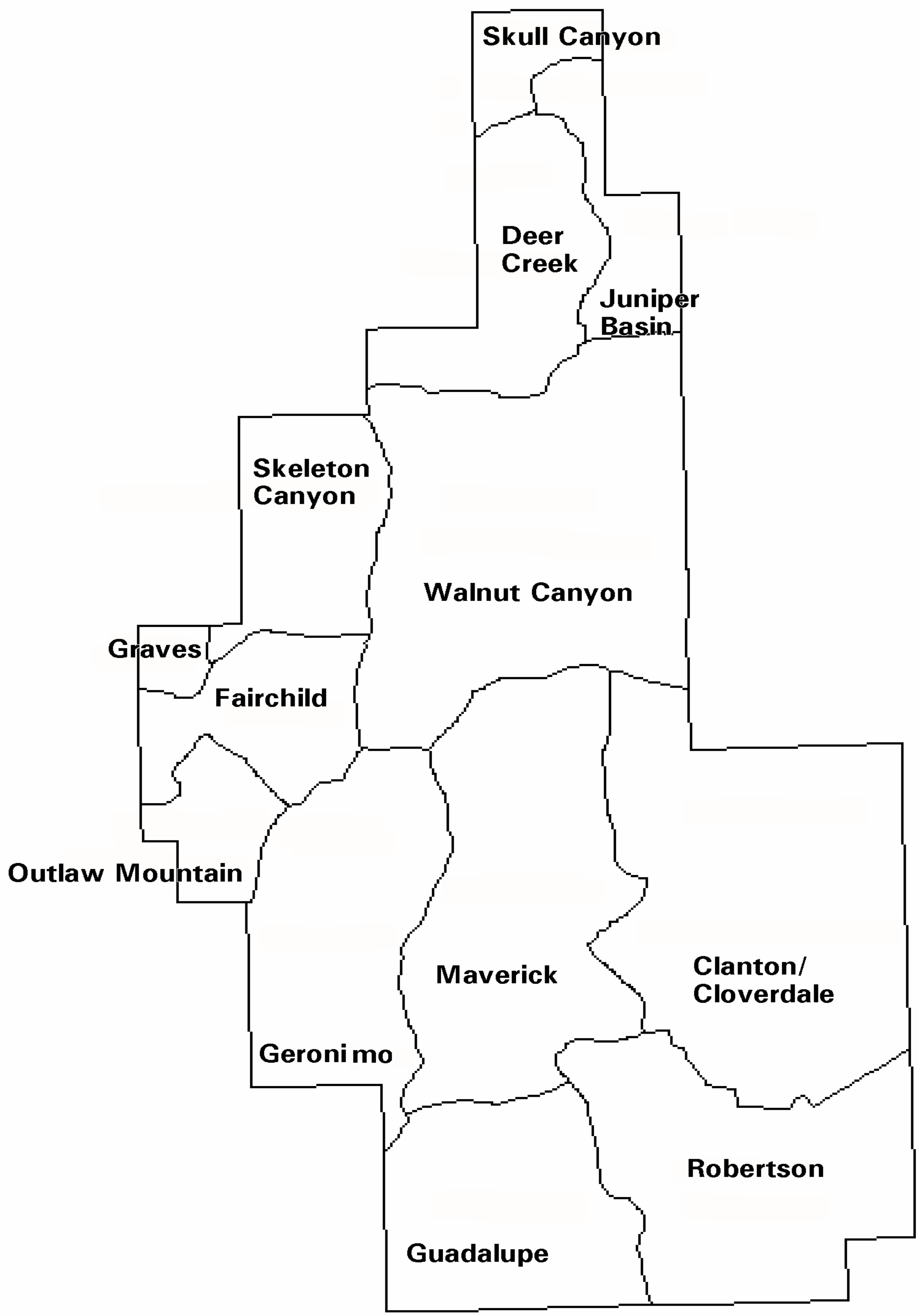

Figure 4. Grazing allotments in the Peloncillo EMA, Coronado National Forest.

Table 5. Range condition and trend in acres in the 17 Santa Rita EMA allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	0	19,812	1615	21,427
Moderately-high	45	86,113	12,804	98,962
High	0	20,911	726	21,637
Total	45	126,836	15,145	142,026

about 34,000 (83,000 ac). All of the EMA is allotted in 13 grazing allotments (Figure 4). Grazing on 11 allotments is considered under the short-term part of the proposed action and one is in the long-term. Permitted numbers are 2,019 livestock (including some private land) and proposed numbers are 2,113. Proposed numbers are higher than permitted numbers when more livestock than permitted are grazed less time than permitted. Permitted Animal Months are about 17,000 and proposed are about 19,000. The proposed stocking rate is about 1.8 ha (4.4 acres) per AM. Most of the EMA is in moderately-high or moderately-low range condition in a static or upward trend (Table 4). The maximum vegetation utilization in the uplands ranges from 45-50 percent and 45 percent in riparian areas.

The Santa Rita EMA covers about 60,000 ha (148,000 ac) and is mostly Madrean woodland, grassland, or desertscrub. Capable hectares are 42,000 (103,000 ac). Most of the EMA is allotted in 17 grazing allotments (Figure 5). Grazing on 14 allotments is considered in the long-term part of the proposed action. Permitted numbers are 3,818 livestock (including some private land and proposed numbers are 3,833. Proposed numbers are higher than permitted numbers when more livestock than permitted are grazed for less time than permitted. Permitted AM's are about 26,000 and proposed 27,000. The proposed stocking rate is about 1.5 ha (3.8 ac) per AM. Most of the EMA is in moderately-high range condition in a static trend (Table 5). The maximum vegetation utilization in the uplands ranges from 35-55 percent with no specific riparian utilization standards.

The Tumacacori EMA covers about 83,000 ha (204,000 ac) and includes the Tumacacori, Atascosa, and Pajarito Mountains. Vegetation is mostly Madrean woodland and desert grassland. Capable hectares are 68,000 (169,000 ac). Most of the EMA is allotted in 16 grazing allotments (Figure 6). Grazing on six allotments is considered under the short-term part of the proposed action and eight are in the long-term. Permitted numbers are 3,334 livestock (including some private land) and proposed numbers are 3,300. Permitted AM's are about 39,000 and

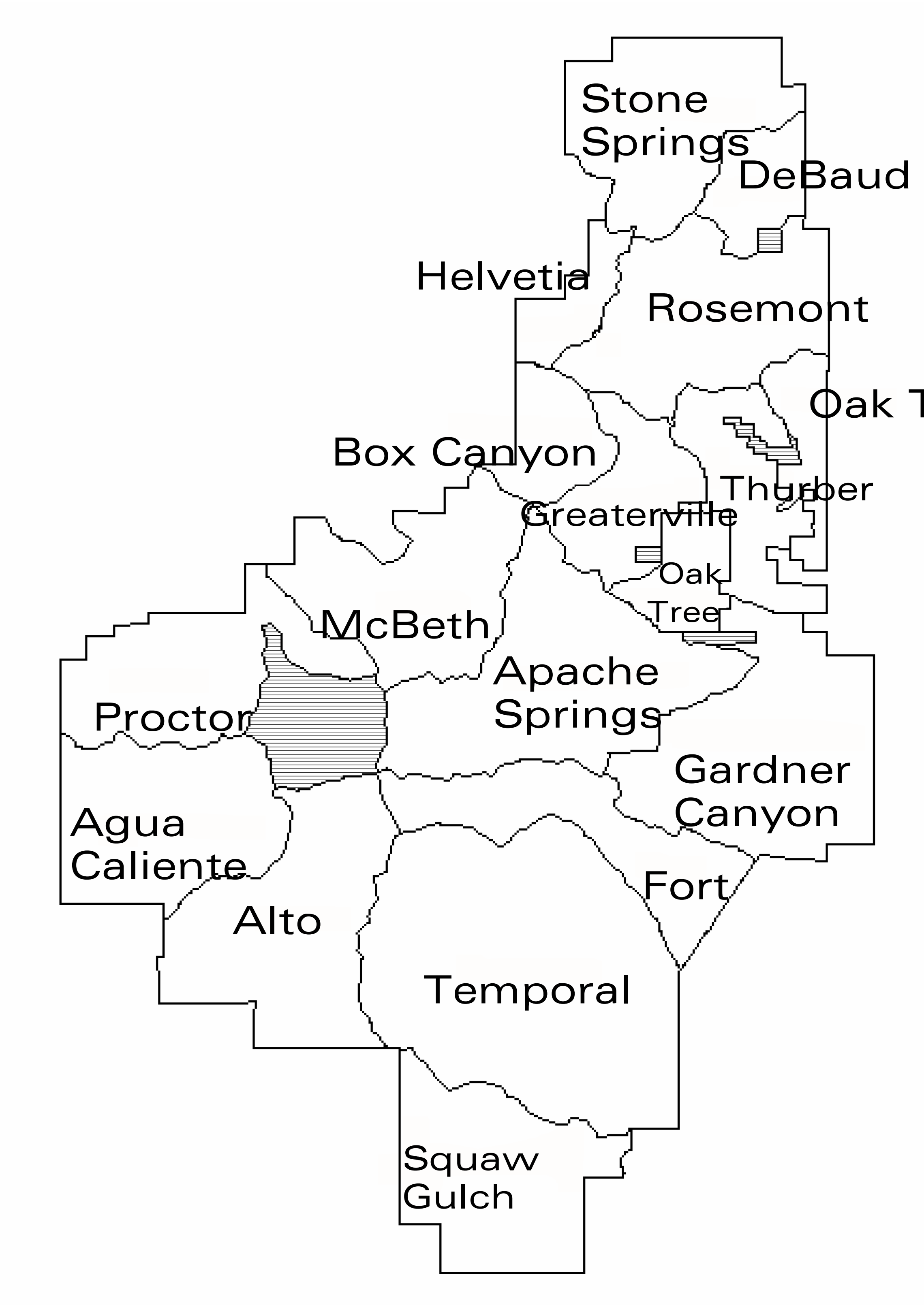

Figure 5. Grazing allotments in the Santa Rita EMA, Coronado National Forest.

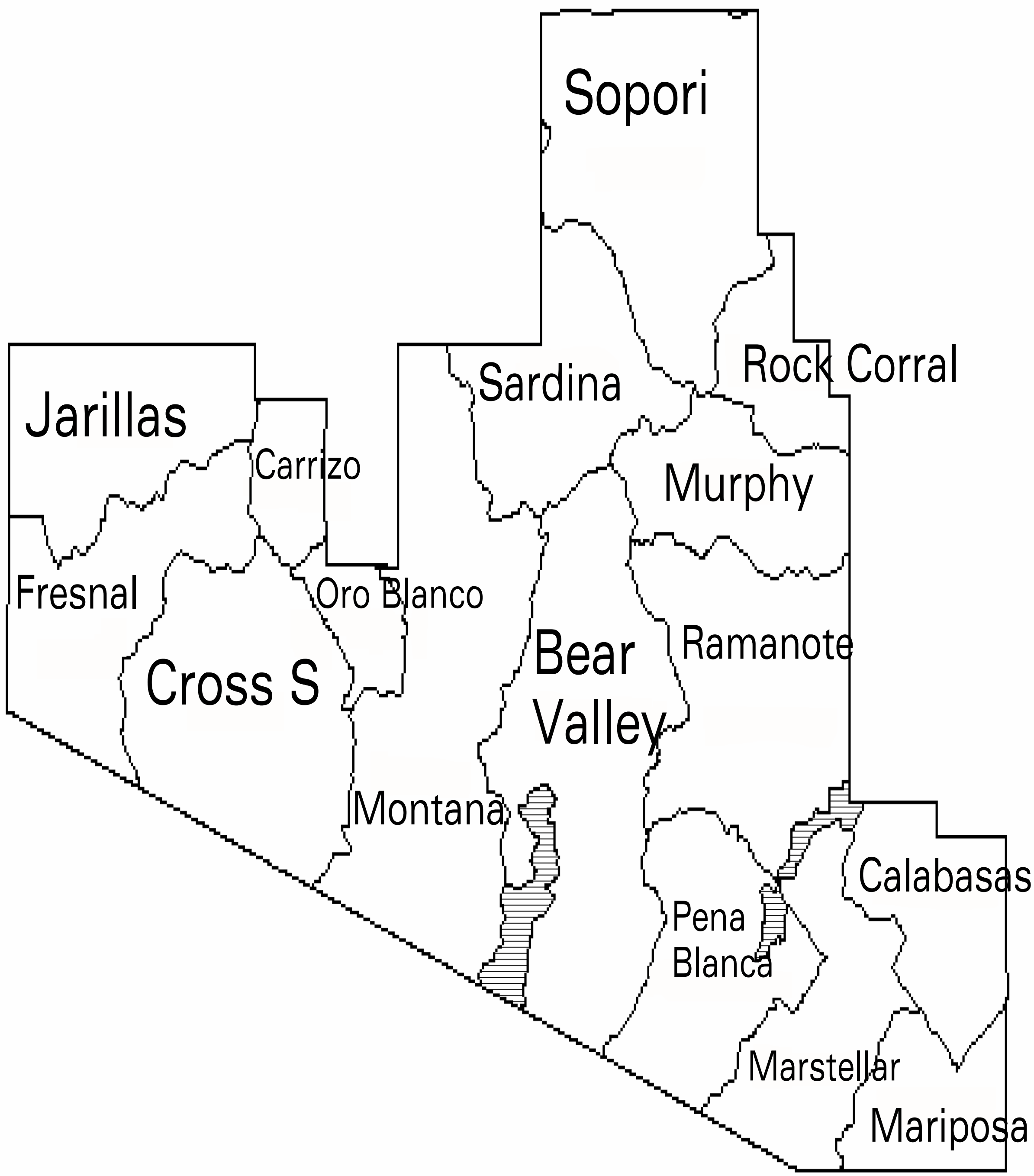

Figure 6. Grazing allotments in the Tumacacori EMA, Coronado National Forest.

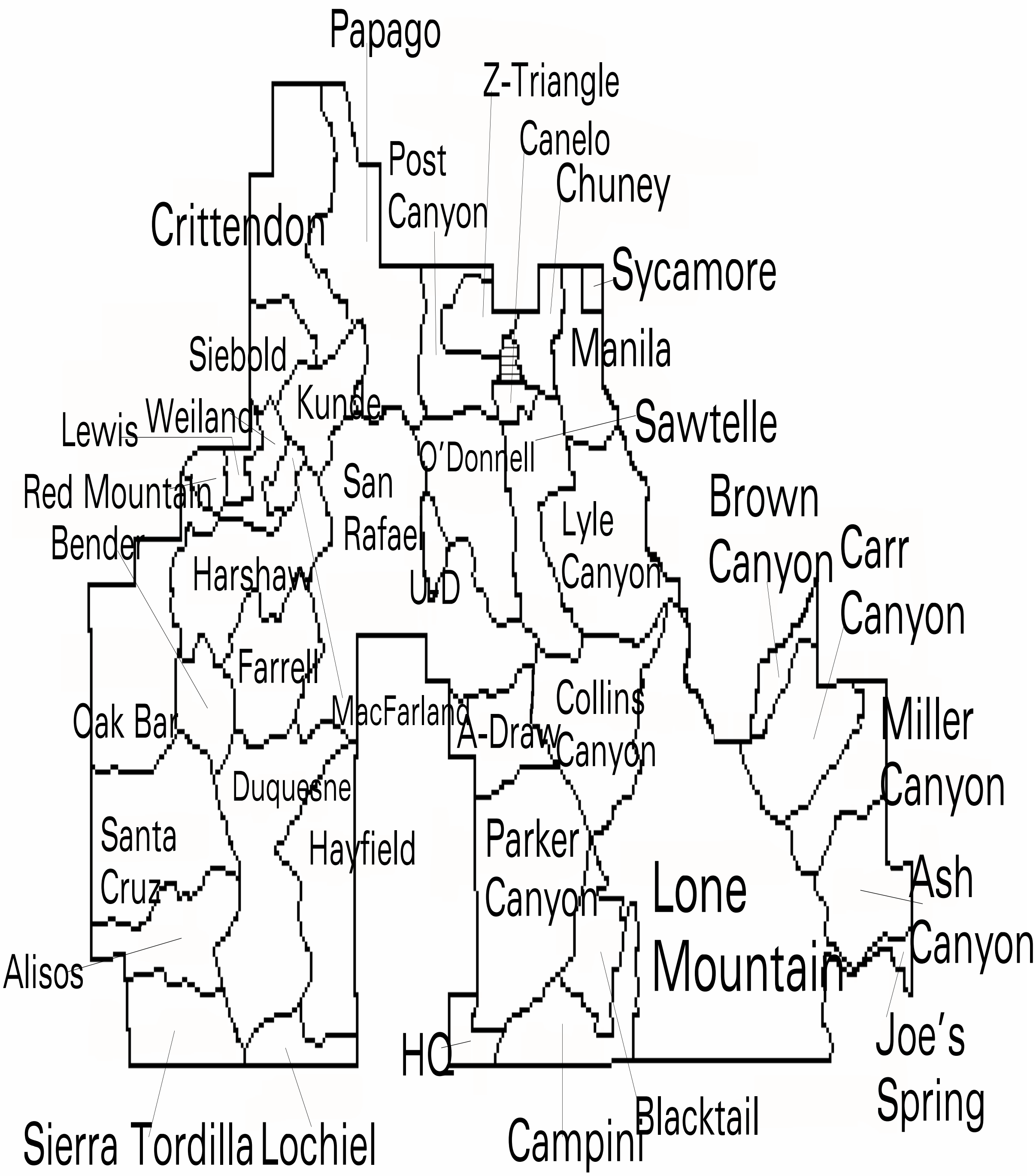

Figure 7. Grazing allotments in the Huachuca EMA, Coronado National Forest.

Table 6. Range condition and trend in acres in the 14 Tumacacori EMA grazing allotments. From Biological Assessment, Appendix B.

	Trend			
Condition	downward	static	upward	Total
Low	0	0	0	0
Moderately-low	0	13,631	86	13,717
Moderately-high	0	119,043	2331	121,374
High	0	18,055	0	18,055
Total	0	150,729	2417	153,146

Table 7. Range condition and trend in acres in the 39 Huachuca EMA grazing allotments. From Biological Assessment, Appendix B.

	Trend			
Condition	downward	static	upward	Total
Low	7474	6065	0	13,539
Moderately-low	52,203	87,838	5910	145,951
Moderately-high	0	57,208	51,829	109,037
High	0	2507	0	2507
Total	59,677	153,618	57,339	271,034

proposed 38,000. The proposed stocking rate is about 1.8 ha (4.4 ac) per AM. Most of the EMA is in moderately-high range condition in a static trend (Table 6). The maximum vegetation utilization in the uplands ranges from 35-55 percent with no specific riparian utilization standards.

The Huachuca EMA covers about 113,000 ha (278,000 ac) and is mostly Madrean woodland, grassland, or various riparian types. Capable hectares are about 97,000 (239,000 ac). Most of the EMA is allotted in 42 grazing allotments (Figure 7). Grazing on 38 allotments is considered under the short-term part of the proposed action and one is in the long-term. Permitted numbers are 5,896 livestock (including some private land) and proposed numbers are 5,471. Permitted AM's are about 70,000 and proposed are about 59,000. The proposed stocking rate is about 1.6

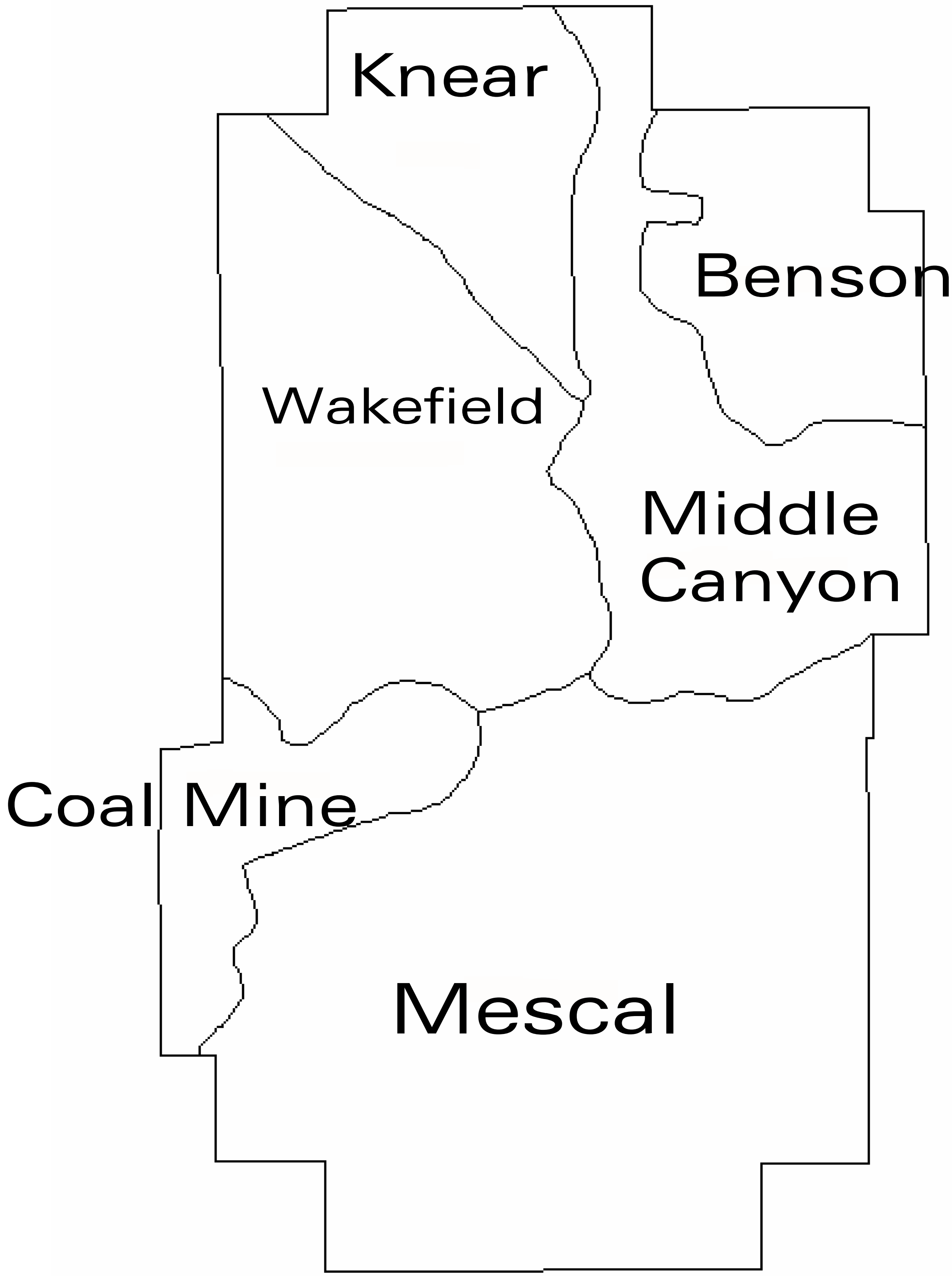

Figure 8. Grazing allotments in the Whetstone EMA, Coronado National Forest.

Table 8. Range condition and trend in acres in the six Whetstone EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	2775	6352	0	9127
Moderately-high	0	35,892	0	35,892
High	0	0	0	0
Total	2775	42,244	0	45,019

ha (4.1 ac) per AM. Most of the EMA is in a static trend (Table 7). The maximum vegetation utilization in the uplands ranges from 35-45 percent with no riparian utilization standards.

The Whetstone EMA covers about 18,000 ha (45,000 ac) and is mostly Madrean woodland and desert grassland. Capable hectares are about 8,000 (20,000 ac). All of the EMA is allotted in six grazing allotments (Figure 8). All are considered under the short-term part of the proposed action. Permitted numbers are 1,370 livestock (including some private land) and proposed numbers are 1,360. Permitted AM's are about 11,000 and proposed AM's are about 10,000. The proposed stocking rate is about 0.8 ha (2.0 ac) per AM. All of the EMA is in moderately-high or moderately-low range condition in a static or downward trend (Table 8). The maximum vegetation utilization in the uplands is 45 percent with no specific riparian utilization standards.

The Galiuro EMA covers about 55,000 ha (135,000 ac) and is mostly Madrean woodland, desert grassland, or desertscrub. Capable hectares are 15,000 (38,000 ac). All of the EMA is allotted in 20 grazing allotments (Figure 9). Grazing on 10 allotments is considered under the short-term part of the proposed action and nine are in the long-term. Permitted numbers are 1,312 livestock (including some private land) and proposed numbers are 1,387. Proposed numbers are higher than permitted numbers when more livestock than permitted are grazed for a shorter time than permitted. Permitted Animal Months are about 12,000 and proposed are about 10,000. The proposed stocking rate is about 1.5 ha (3.8 ac) per AM. Most of the EMA is in moderately-high range condition in an upward or static trend (Table 9). The maximum vegetation utilization in the uplands ranges from 25-50 percent and 40 percent in riparian areas.

The Pinaleno EMA covers about 81,000 ha (199,000 ac) and is mostly Madrean woodland, desertscrub and grassland, or coniferous forest. Capable hectares are 48,000 (118,000 ac). Most

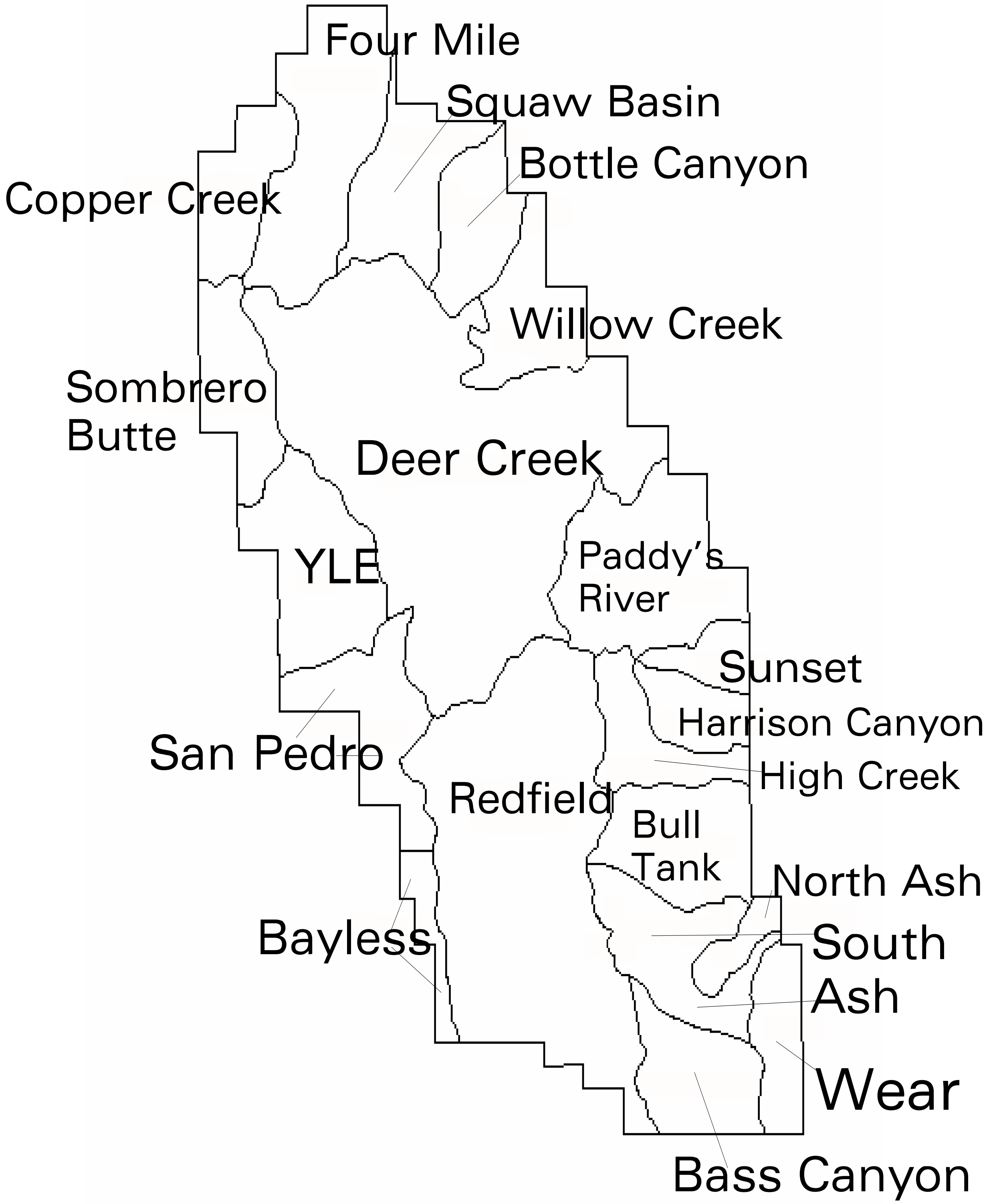

Figure 9. Grazing allotments in the Galiuro EMA, Coronado National Forest.

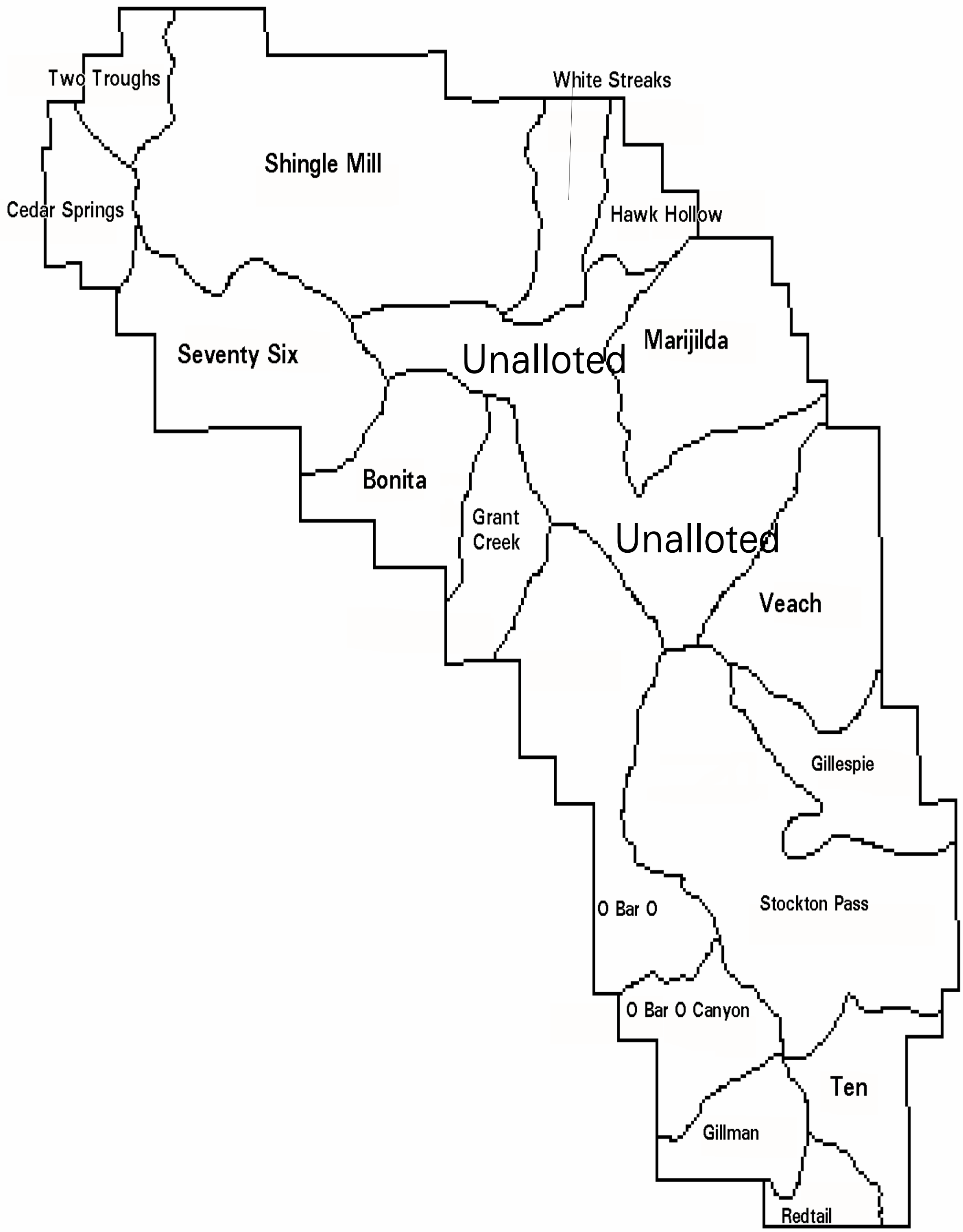

Figure 10. Grazing allotments in the Pinaleno EMA, Coronado National Forest.

Table 9. Range condition and trend in acres in the 19 Galiuro EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	0	2009	6305	8314
Moderately-high	1586	23,999	7245	32,830
High	0	310	1129	1439
Total	1586	10,651 (26,318)	14,679	42,583

Table 10. Range condition and trend in acres in the 17 Pinaleno EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	1019	1019
Moderately-low	14,153	441	13,736	28,330
Moderately-high	0	65,908	77,475	143,383
High	0	2550	491	3041
Total	14,153	68,899	97,721	175,773

of the EMA is allotted in 17 grazing allotments (Figure 10). Grazing on nine allotments is considered under the short-term part of the proposed action and eight are in the long-term.

The Santa Teresa EMA covers about 20,000 ha (50,000 ac) and is mostly chaparral and Madrean woodland. Capable hectares are 4,900 (12,000 ac). All of the EMA is allotted in nine grazing allotments (Figure 11). Grazing on six allotments is considered under the short-term part of the proposed action and three are in the long-term. Permitted numbers are 792 livestock (including some private land) and proposed are 613. Permitted AM's are about 7,900 and proposed are about 3,400. The proposed stocking rate is about 1.4 ha (3.5 ac) per AM. Most of the EMA is in moderately-high range condition in an upward or static trend (Table 11). The maximum vegetation utilization in the uplands ranges from 35-50 percent and 40 percent in riparian areas.

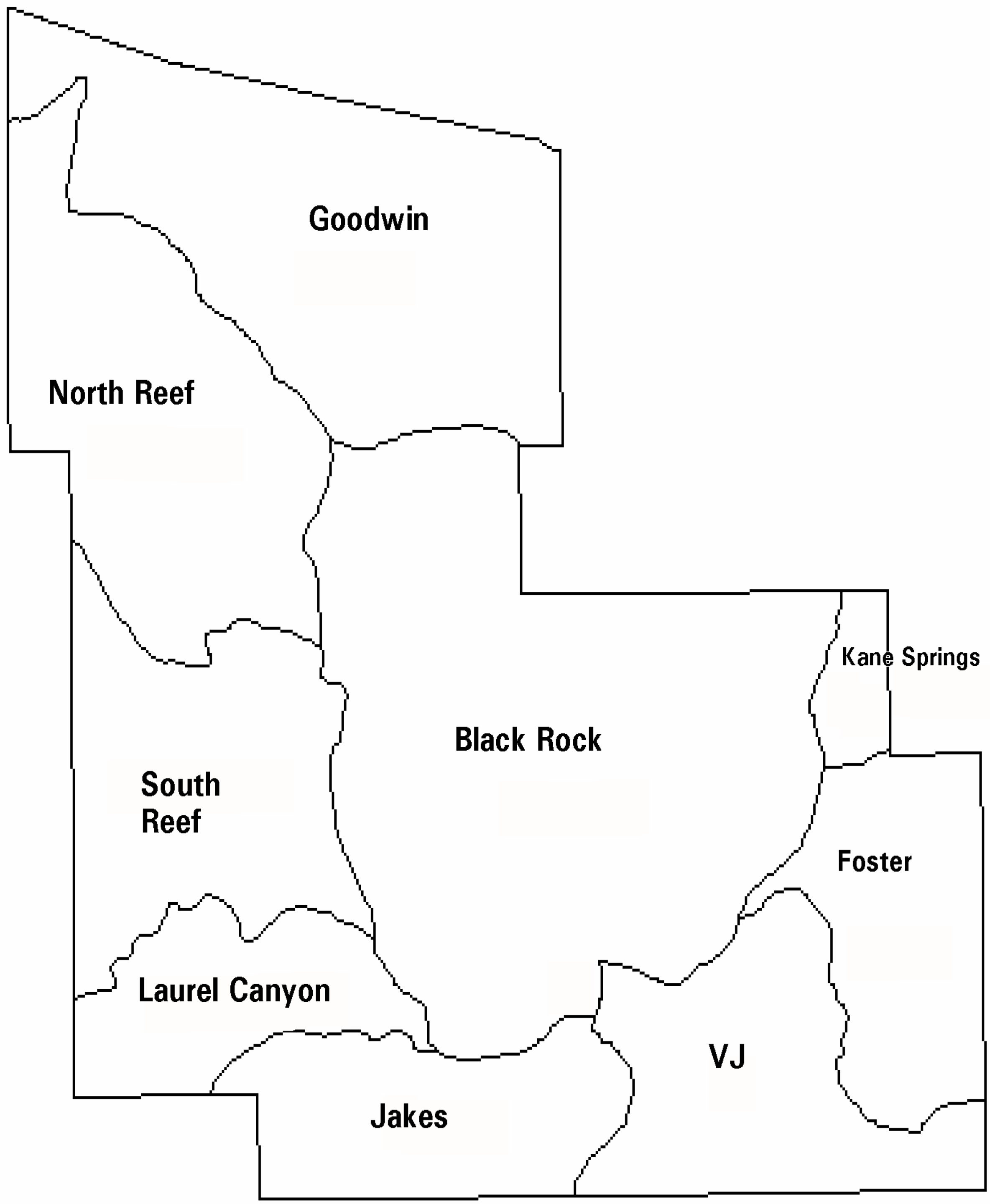

Figure 11. Grazing allotments in the Santa Teresa EMA, Coronado National Forest.

Table 11. Range condition and trend in acres in the nine Santa Teresa EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low	904	7474	540	8918
Moderately-high	0	13,801	27,117	40,918
High	0	0	0	0
Total	904	21,275	27,657	49,836

Table 12. Range condition and trend in acres in the five Winchester EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Trend			Total
	downward	static	upward	
Low	0	0	0	0
Moderately-low		0659	0	659
Moderately-high	0	3297	16,026	19,323
High	0	532	0	532
Total	0	4488	16,026	20,514

The Winchester EMA covers about 11,000 ha (28,000 ac) and is mostly Madrean woodland and various riparian types. Capable acres are 2,400 ha (6,000 ac). Seventy-five percent of the EMA is allotted in five grazing allotments (Figure 12). Grazing on two allotments is considered under the short-term part of the proposed action and three are in the long-term. Permitted and proposed numbers are 593 livestock. Permitted AM's are about 7,000 and proposed are about 3,000. The proposed stocking rate is about 0.8 ha (2.0 ac) per AM. Most of the EMA is in moderately-high range condition in an upward or static trend (Table 12). The maximum vegetation utilization in the uplands ranges from 30-50 percent and in riparian areas from 30-40 percent.

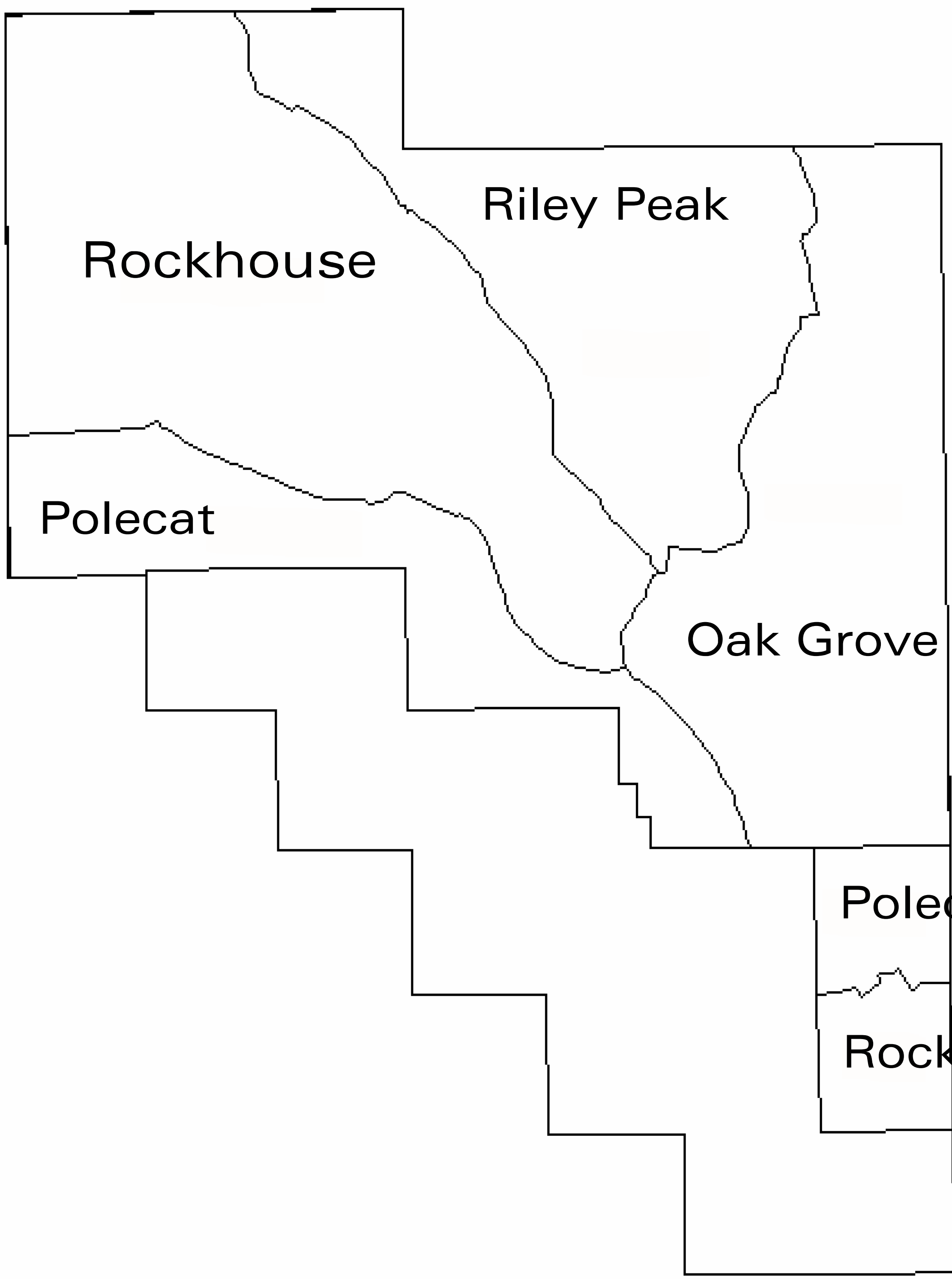

Figure 12. Grazing allotments in the Winchester EMA, Coronado National Forest.

Table 13. Range condition and trend in acres in the 14 Santa Catalina EMA grazing allotments. From Biological Assessment, Appendix B.

Condition	Acres
Low	20,203
Moderately-low	69,888
Moderately-high	33,221
High	4037
Total	127,349

The Santa Catalina EMA covers about 107,000 ha (265,000 ac) and is mostly Madrean woodland and desertscrub. Capable hectares are about 50,000 (124,000 ac). Seventy percent of the EMA is allotted in 14 grazing allotments (Figure 13). Grazing on nine allotments is considered under the short-term part of the proposed action and five are in the long-term. Permitted numbers are 2,951 livestock and proposed are 2,874. Permitted AM's are about 22,000 and proposed are about 24,000. The proposed stocking rate is about 2.1 ha (5.2 ac) per AM. Most of the EMA is in moderately-low or moderately-high range condition with no trend (Table 13). The maximum vegetation utilization in the uplands ranges from 30-45 percent with no specific riparian utilization standards.

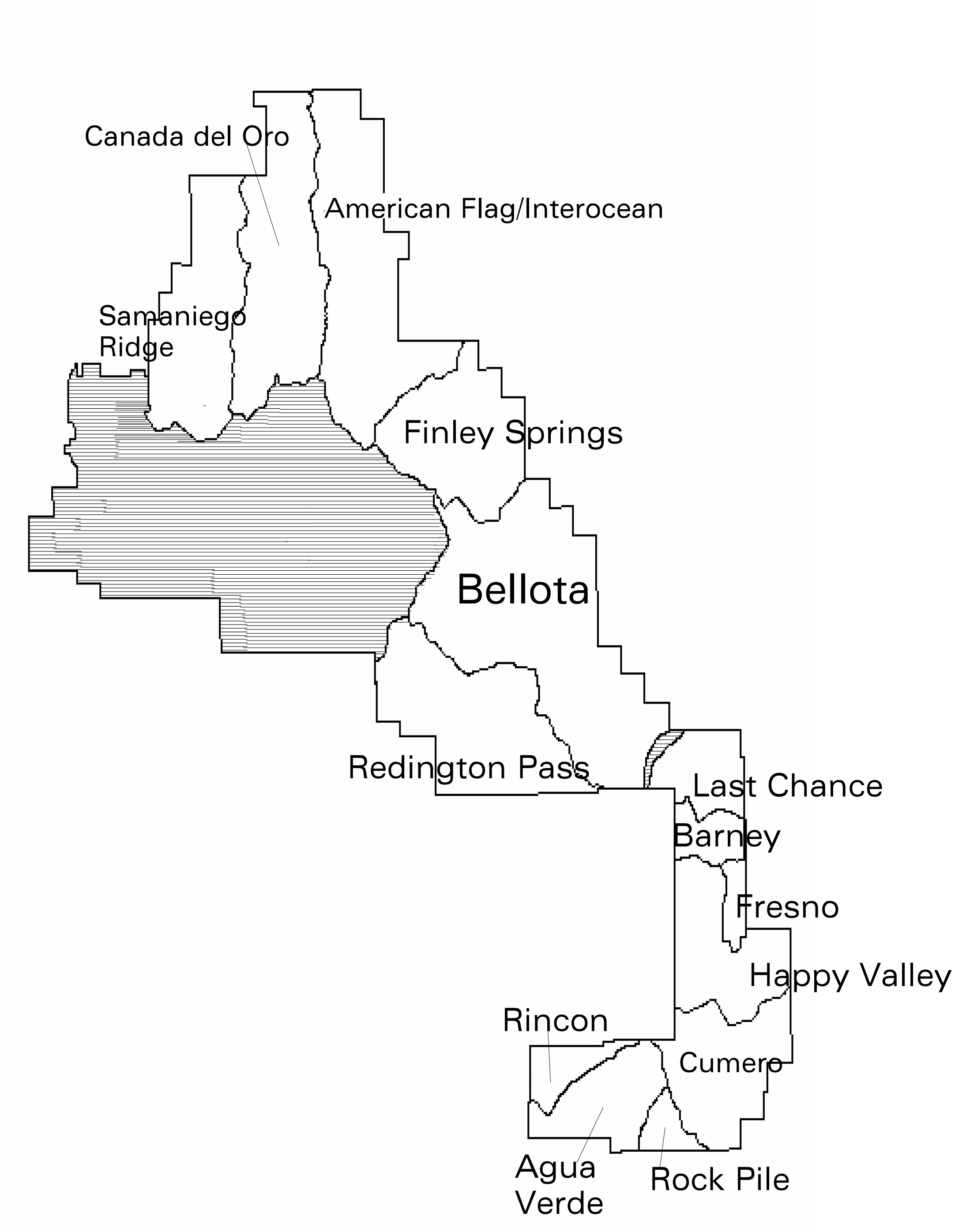

Figure 13. Grazing allotments in the Santa Catalina EMA, Coronado National Forest.

SCOPE OF THE CONSULTATION

This consultation is programmatic, in that the effects of the livestock grazing program are evaluated broadly over a large range of actions on 187 grazing allotments on the Forest. The time-frame of the proposed action varies by allotment and is up to ten years. This opinion addresses all aspects of the proposed grazing activities to the project level. However, the Forest has a continuing obligation under section 7(a)(2) of the Act and 50 CFR 402.14(a) to review all of its actions to decide if they may affect a listed species or critical habitat in a manner not addressed in the biological opinion. If the Forest Service determines there is a may affect, they must enter formal consultation with the Service if the effects of the action have not undergone consultation.

The effects of actions that are interrelated and interdependent to the proposed action are considered effects of the proposed grazing program. "Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR 402.02). The Service's Section 7 Handbook provides further guidance on the definition of "interrelated and interdependent actions" by establishing the following rule: Determining if an action is interrelated or interdependent depends on the "but for" test. Ask whether the Federal, State, or private activity could occur "but for" the proposed action. Effects of interrelated and interdependent actions are in some cases particularly important for grazing activities on non-Federal inholdings within Forest allotments. Grazing activities will occur on both Federal and non-Federal lands in the allotments under consultation. Grazing off the Forest is not part of the proposed action; however, grazing systems and prescriptions on Forest lands may influence if and how cattle are grazed on non-Federal lands. In these cases, grazing activities on the non-Federal lands in the allotment are interrelated or interdependent to grazing on the Forest. This is especially true in allotments that are predominantly managed by the Coronado, but there are small private or State inholdings.

Anticipated incidental take in the “Take Statements” for animal species is based on all effects of the proposed action. If the reasonable and prudent measures and terms and conditions are implemented, the Forest is exempted from the incidental take prohibitions in section 9 of the Act if such take complies with the incidental take statement. The take statement applies to activities funded, authorized, or carried out by the Forest Service and does not authorize take by private individuals, the State of Arizona, or others, unless such take is incidental to an action authorized by the Forest Service and part of this proposed action. Permittees and others conducting grazing activities not authorized by the Forest Service should apply for a section 10(a)(1)(B) incidental take permit for those actions that may result in take of a listed species.

Most of the incidental take statements herein include reporting requirements. We request that the Coronado National Forest package all reports and monitoring data required in the terms and conditions into an annual report due March 15 of each year. The first annual report will be due March 15, 2000.

LESSER LONG-NOSED BAT (*Leptonycteris curasoae yerbabuenae*)

Status of the Species

The lesser long-nosed bat is a medium size, leaf-nosed bat. It has a long muzzle, a long tongue, and is capable of hover flight. These features are adaptations that allow the bat to feed on nectar from the flowers of columnar cacti such as the saguaro (*Cereus giganteus*) and organ pipe cactus (*Stenocereus thurberi*), and from paniculate agaves such as Palmer's agave (*Agave palmeri*) and Parry's agave (*A. parryi*) (Hoffmeister 1986). Palmer's agave exhibits many characteristics indicating they are pollinated by bats, such as nocturnal pollen dehiscence and nectar production, light colored and erect flowers, strong floral order, and high levels of pollen protein with relatively low levels of nectar sugar concentrations (Slauson 1996). Parry's agave demonstrates many (although not all) of these same morphological features (Gentry 1982). Slauson (1999) has demonstrated that there was a mutualistic relationship between Palmer's agave and the lesser long-nosed bat, though this relationship was asymmetric. The bat is quite dependent on the agave for food during a certain period, but the agave has other pollinator options.

The lesser long-nosed bat is one of four members of the tropical bat family Phyllostomidae which are found in the United States. It was formally separated from the Mexican long-nosed bat (*L. nivalis*) as a distinct species (*L. sanborni*) by Hoffmeister (1957). *L. nivalis* is a monotypic species that occurs in Mexico and southwestern New Mexico and Texas. Arita and Humphrey (1988) reviewed the taxonomic status of bats of the genus *Leptonycteris* and concluded that *L. sanborni* is conspecific with *L. curasoae* of northern Venezuela and the Dutch Antilles. They recognized two subspecies of *L. curasoae*; a northern subspecies (*L. c. yerbabuenae* = *L. sanborni*) found in Mexico and southern Arizona and New Mexico and a southern subspecies (*L. c. curasoae*) found in northern South America. Wilkinson and Fleming (1995) have confirmed the genetic distinctiveness of the two subspecies of *L. curasoae* and the specific distinction between *L. curasoae* and *L. nivalis* using molecular data. The lesser long-nosed bat is a medium-sized bat with a forearm measuring 51 to 56 mm (2.0-2.2 in) and weighing 20 to 25 grams (0.7-0.9 oz) as an adult. Adult fur is grayish to reddish-brown; juveniles have gray fur. Its elongated rostrum bears a small, triangular noseleaf, its ears are relatively small and simple in structure, and it has a minute tail. It is generally smaller in external and cranial measurements than *L. nivalis*. *L. curasoae* can be distinguished from the Mexican long-tongued bat (*Choeronycteris mexicana*), with which it co-occurs in Arizona, by the larger size, less elongated snout, and tiny tail.

The lesser long-nosed bat is migratory and found throughout its historic range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. In southern Arizona lesser long-nosed bat roosts have been found from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County) and south to the international boundary. Individuals have also been observed from the vicinity of the Pinaleno Mountains (Graham County) and as far north as the McDowell Mountains (Maricopa County)(AGFD Heritage Data Management System). This bat is also known from far southwestern New Mexico in the Animas and Peloncillo Mountains (Hidalgo County). It is a seasonal resident in Arizona, usually arriving in early April and leaving in mid-September to early October. It resides in New Mexico only from mid-July to early September (Hoyt et al. 1994).

Roosts in Arizona are occupied from late April to October (Cockrum and Petryszyn 1991, Sidner 1997). In spring, adult females, most of which are pregnant, arrive in Arizona and gather into maternity colonies in southwestern Arizona. These roosts are typically at low elevations near concentrations of flowering columnar cacti. Litter size is one. After the young are weaned these colonies disband in July and August; some females and young move to higher elevations, ranging up to more than 1,818 m (6,000 ft), primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Actual dates of these seasonal movements by lesser long-nosed bats are rather variable from one year to the next (Cockrum and Petryszyn 1991, Fleming et al. 1993). Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains but also occur with adult females and young of the year at maternity sites (USFWS 1997b). Throughout the night between foraging bouts both sexes will rest in temporary night roosts (Hoffmeister 1986).

The lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. In Arizona, four species of agave and two cacti are the main food plants (Hayward and Cockrum 1971, Wilson 1985). The agaves include Palmer's agave, Parry's agave, desert agave (*A. deserti*), and amole (*A. schotti*). Amole is considered to be an incidental food source. The cacti include saguaro and organpipe cactus. Nectar of these cacti and agaves are high energy foods. Concentrations of food resources appear to be patchily distributed on the landscape and the nectar of each plant species utilized is only seasonally available. Cacti flowers and fruit are available during the spring and early summer; blooming agaves are available through the summer, primarily from July through early October, though Parry's agave blooms earlier. Columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desertscrub areas, desert grasslands and shrublands, and into the mountains. Parry's agave is usually found at higher elevations than Palmer's agave (Gentry 1982). The bats are generally considered to time their movement and feeding to the progression of flowering associated with these cacti and agaves. Many species of columnar cacti and agaves appear to provide a "nectar corridor" for lesser long-nosed bats as they migrate in spring from Central America and Mexico to as far north as southern Arizona, through fall when they return south (Gentry 1982, Flemming et al. 1993, Slauson et al. 1998).

Lesser long-nosed bats appear to be opportunistic foragers and efficient fliers, capable of flight speeds up to 23 kilometers per hour (14 mph) (Sahley et al. 1993), and often foraging in flocks. Seasonally available food resources may account for the seasonal movement patterns of the bat. The lesser long-nosed bat is known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to flowering columnar cacti have been documented in Arizona at 24 km (15 mi), and in Mexico at 40 km (25 mi) and 61 km (38 mi)(one way)(Dalton et al. 1994; V. Dalton, Tucson, pers. comm., 1997; Y. Petryszyn, University of Arizona, pers. comm., 1997). A substantial portion of the lesser long-nosed bats at the Pinacate Cave in Sonora (a maternity colony) fly 40 to 50 km (25-31 mi) each night to foraging areas in Organ Pipe Cactus National

Monument (USFWS 1997b). Horner et al. (1990) found that lesser long-nosed bats commuted 48 to 58 km (30-36 mi) round trip between an island maternity roost and the mainland in Sonora; the authors suggested these bats regularly flew at least 80 to 100 km (50-62.5 mi) each night. Lesser long-nosed bats have been observed feeding at hummingbird feeders many miles from the closest potential roost site (Petryszyn, pers. comm., 1997).

The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered in 1988 (USFWS 1988a). No critical habitat has been designated for this species. The recovery plan was completed in 1997 (USFWS 1997b). Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. There has been a significant degree of debate and controversy regarding the actual population size and appropriate listing status of the species. The recovery plan states that the species will be considered for delisting when three major maternity roosts and two post-maternity roosts in the United States, and three maternity roosts in Mexico have remained stable or increased in size for at least five years, following the approval of the recovery plan.

Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (USFWS 1997b). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are that determine selection of roost locations, the species seems sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements.

Considerable evidence exists suggesting a dependence of *Leptonycteris* on certain agaves and cacti, although some Palmer's agave has been shown not to be dependent on *Leptonycteris* for pollination (Slauson 1996, 1999; Slauson et al. 1998). Activities that adversely affect the density and productivity of columnar cacti and paniculate agaves may adversely affect populations of lesser long-nosed bats (Abouhalder 1992, USFWS 1997b). Excess harvest of agaves in Mexico, collection of cacti in the United States, and conversion of habitat due to urban expansion, agricultural uses, livestock grazing, and other development may contribute to the decline of long-nosed bat populations (USFWS 1988a). Livestock grazing in areas with agaves may affect the long-nosed bat, particularly under high intensity use. Intense grazing can result in trampling of young agaves and cacti, soil compaction, erosion, alteration of the plant community species composition and abundance, and changes in the natural fire regime. Activities that directly or indirectly promote invasions or increased density of nonnative grasses, particularly Lehmann lovegrass (*Eragrostis lehmanniana*), species of *Bromus*, and Mediterranean grass (*Schismus barbatus*), may result in increased fire frequency and intensity (Minnich 1994) which in turn may have related impacts to paniculate agave and columnar cacti populations. Grasses are probably the strongest competitors of agave seedlings (L. Slauson, Desert Botanical Gardens, Phoenix, pers. comm., 1997). Agaves are monocarpic, flowering only once and then dying. Livestock and wild herbivores feed on young agave stalks which preclude the plant from flowering. Saguaros are also affected by livestock activity. Saguaros are dependent on nurse plants to provide cover during their sensitive seedling stage. Livestock grazing may affect the density and distribution of nurse plants, increasing the mortality of saguaro seedlings. Young cacti may also be trampled and compaction and reduced infiltration may adversely alter germination sites.

Food requirements of the lesser long-nosed bat are very specific. Adequate numbers of flowers or fruits are required within foraging range of day roosts and along migration routes to support large numbers of this bat. Locations of good feeding sites play an important role in determining availability of potential roosting sites, and roost/food requirements must be considered jointly when discussing the habitat requirements of this bat. A suitable day roost is probably the most important habitat requirement, but potentially suitable roosts must be within reasonable foraging distances of sufficient amounts of required foods before this bat will use them. It seems evident that the lesser long-nosed bat forages over wide areas and that large roosts require extensive stands of cacti or agaves for food. Therefore, destruction of food plants many kilometers from a roost could have a negative impact on this bat (USFWS 1997b).

The lesser long-nosed bat recovery plan (USFWS 1997b) identifies the need to protect foraging areas and food plants. Columnar cacti and agaves provide critical food resources for this bat. Populations of these plants need continued protection to sustain nectar-feeding bat populations. A critical need in this area is infomation about the size of the foraging areas around roosts so that adequate areas can be protected. This information will show the minimum area needed to support a roost of nectar- and fruit-eating bats, provided the roost locations are known.

The lesser long-nosed bat recovery plan (USFWS 1997b) provides specific discussion and guidance for management and information needs regarding bat forage resources.

> "...that *Leptonycteris* bats forage over wide areas and that large roosts require extensive stands of cacti or agaves for food. Therefore, destruction of food plants many kilometers from *Leptonycteris* roosts could have a negative impact on this bat."
>
> "Proper management of forage plant species requires we understand how the lesser long-nosed bat is using these resources. This includes developing information on economical flight distances and suitable distribution of forage plants around the roost sites and along migratory paths."
>
> One of the four delisting criteria: "Sufficient progress in the protection of both roosts and forage plant habitats that support those roosts from disturbance or destruction must have been made."
>
> One of the four delisting criteria: "No new threats to the species, its roost or foraging habitats, have been identified and currently known threats have not increased significantly."

> "The law does not go far enough to ensure that these plants [columnar cacti and agaves] will be safeguarded in viable populations over the long term. The section 7 requirements of the Act do provide a level of protection for these plants since their presence is required for the bats to maintain their populations, but this protection is limited because of lack of knowledge of what is needed in foraging habitat to support the roost populations. There is likely a continuing loss of forage plants and their habitat in Arizona and New Mexico because the protections available are not sufficient to completely stop this loss."
>
> Narrative outline of recovery action 2: "Protect foraging areas and food plants. Columnar cacti and agaves provide critical food resources for this bat. Populations of these plants need continued protection to sustain nectar-feeding bat populations. A critical need in this area is information about the size of the foraging areas around roosts so that adequate areas can be protected. This information will indicate the minimum area needed to support a roost of nectar- and fruit-eating bats.
>
> Recovery action 211: "Describe landscape features of suitable foraging habitat. Information on densities of forage plants, spatial relations between areas identified as used by bats and timing of food availability should be collected to assess the need to protect or manage forage plant habitat to provide adequate forage opportunities."
>
> Recovery action 213: "Describe effects of human uses on populations of forage plants. The loss or decline in forage plant populations due to urban development, livestock grazing, recreation, harvest for commercial purposes (examples are sale of cacti and use of agave heads for mescal production), introduction of non-native plant species and other factors is a significant threat to the long-term stability of lesser long-nosed bat populations. Effects to foraging areas around roosts and along migratory paths should both be considered in this evaluation."

Known major roost sites include 16 large roosts in Arizona and Mexico (USFWS 1997b). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by a total of more than 150,000 lesser long-nosed bats. The numbers above indicate that, although many of these bats are known to exist, the relative number of known large roosts is small. Disturbance of these roosts and the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

Environmental Baseline

The Forest requested formal consultation on the effects of livestock management to the lesser long-nosed bat for 152 grazing allotments. These allotments are found throughout the Forest, are in each of the twelve EMA's, and include the majority of acres within most EMA's. Table 14 lists allotments by EMA for which the Forest made likely to adversely affect determinations for the lesser long-nosed bat.

Leptonycteris bats require suitable forage plants (paniculate agaves and columnar cacti) and suitable roost sites. Mines and caves occurring across the Forest provide suitable sites for post-maternity roosts of the lesser long-nosed bat. Potential foraging habitat for the lesser long-nosed bat on the Forest is found where paniculate agaves, and perhaps saguaro, occur. Agaves are found in varying densities and age classes within the broad vegetation community classification of desertscrub, desert grassland, interior chaparral, oak woodland, pinyon-juniper woodland, pine-oak woodland, and mixed conifer. The primary agave used by the bat is Palmer’s agave, which, as estimated by the Forest, is widely scattered over 390,000 hectares (1,000,000 ac) at densities less than 3 to over 40 individuals per hectare (10-200 per acre), generally between the elevations of 909 and 1,818 m (3,000-6,000 ft). Parry’s agave is found between 1,545 and 2,485 m (5,000-8,200 ft), and begins blooming in mid-spring.

The analysis of grazing activities undertaken by the Forest was conducted on a landscape level, evaluating for each allotment the permitted grazing utilization rates and use of the allotment during the agave bolting season (April 15 through September 15) against the general distribution of lesser long-nosed bat forage plants (primarily agaves, but also saguaros). This analysis did not include information on specific agave densities by allotment or EMA. There are 455,848 capable rangeland hectares (1,139,622 ac) on the Coronado NF. Of these, 83 percent [380,023 ha (950,057 ac)] may have livestock use at some time during the agave bolting season or have utilization levels above 45 percent (as measured in key areas). Assessing bolting season use is confounded because no information has been presented on the number of pastures present or pasture rotation schedules, so all acres of the allotment have been calculated into this parameter, though it is not expected that all pastures will be used during the bolting period. See the general discussion of Environmental Baseline and Table 15 for overall descriptions and ecological condition information for each of the EMA’s.

Status of the Species in the Project Area

No documented lesser long-nosed bat maternity colonies are known from the Forest, however, there is a suspected maternity colony on Saguaro National Monument in the Rincon Mountains immediately next to the Forest. Several post-maternity roosts which house from many thousands to only a few individual bats are known from various locations on and near the Forest. These roosts are generally occupied from July through September, though the bats have been recorded in southeast Arizona in April (Petryszyn, pers. comm., 1999) and they may remain into October (Sidner 1997). Based on distances lesser long-nosed bats have been known to travel from roost

Table 14. Allotments by EMA with adverse affect determinations for lesser long-nosed bat on the Coronado National Forest.

Chiricahua EMA	Boss	Cochise Head
Barboot	Bruno	East Whitetail
Big Bend	Cienega	Horseshoe

Hunt Canyon
Jackwood
Lower Rock Creek
Lower Rucker
Pedragosa
Pine
Price Canyon
Pridham
Rak
Sanders
Sanford
Stanford
Sulphur Draw
Tex Canyon
Turkey Creek
West Whitetail
Willie Rose

Dragoon EMA

Black Diamond
Fourr
Granite Springs
Halfmoon
Noonan
Reppy
Slavin
Walnut Springs

Peloncillo EMA

Clanton/Cloverdale
Deer Creek
Fairchild
Geronimo
Graves

Guadalupe
Juniper Basin
Maverick
Outlaw Mountain
Robertson
Skeleton Canyon
Walnut Canyon

Santa Rita EMA

Agua Caliente
Alto
Apache Springs
Box Canyon
Debaud
Fort
Gardner
Greaterville
Helvetia
McBeth
Oak Tree
Proctor
Squaw Gulch
Temporal
Thurber

Tumacacori EMA

Calabasas
Carrizo
Cross S
Fresnal
Jarillas
Mariposa
Marstellar
Murphy
Oro Blanco

Pena Blanca
Ramanote
Rock Corral
Sardina
Sopori

Huachuca EMA

Alisos/ Sierra Tordilla
Canelo
Crittendon
Duquesne
Farrell
Harshaw
Hayfield
Joe's Spring
Kunde
Lewis
Lochiel
Lone Mountain/ Parker
Lyle Canyon
Manila
McFarland
Oak Bar
O'Donnell
Papago/Z-triangle
Post Canyon
Red Mountain
San Rafael
Santa Cruz
Sawtelle
Seibold
Sycamore

Table 14 continued. Allotments by EMA with adverse affect determinations for lesser long-nosed bat on the Coronado National Forest.

U-D
Weiland

Whetstone EMA

Benson
Knear

Galiuro EMA

Bottle Canyon
Bull Tank

Copper Creek
Deer Creek
Harrison Canyon
High Creek
North Ash
Paddys River
Sombrero Butte
South Ash
Squaw Basin
Sunset
Wear
Willow Creek
YLE

Pinaleno EMA
Bonita
Cedar Springs
Gillespie
Gillman
Grant Creek
Hawk Hollow
Marijilda
O Bar O
O Bar O Canyon
Redtail
Seventy Six
Shingle Mill
Stockton Pass
Ten
Two Troughs
Veach
White Streaks

Santa Teresa EMA
Black Rock
Jakes
Laurel Canyon
North Reef
South Reef
VJ

Winchester EMA
Oak Grove
Riley Peak
Rockhouse

Santa Catalina EMA
Am Flag/ Interocean
Bellota
Cumero
Finley Springs
Happy Valley
Redington Pass
Rincon/ Agua Verde
Samaniego

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sites to foraging areas, potential foraging habitat may extend in a 64 km (40 mi) radius from roosts. From the known roosts in southeastern Arizona, all or major portions of each EMA lie within potential foraging range of the lesser long-nosed bat. In addition, thorough surveys for the species have not been completed and there are many potential roost sites (mines, caves, bridges, and abandoned structures) within each EMA.

Chiricahua EMA

The Forest reports one known roost site close to the Chiricahua EMA. However, besides this site, the AGFD Heritage Data Management System lists 10 additional locations in this EMA and the surrounding area where the lesser long-nosed bat has been observed. These sites include the vicinities of Blue Mountain, Whitetail Canyon, Cave Creek and Portal, Paradise, Fort Bowie,

Table 15. Allotment use, capable acres, soil condition, and range condition summary by EMA. Allotment use is presented as a percent of capable rangeland acres for those factors affecting lesser long-nosed bat forage plants. Acres reflected in agave bolting season use (April 15 through September 15) are the maximum acres grazed sometime during the bolting season (actual number of acres grazed is less due to grazing rotation and rest systems). Maximum allowed utilization levels are as measured at key areas. Allotment conditions are presented as a percent of total EMA area (USFS 1998c).

EMA (#) LAA Allotments	Percent of Total EMA			Percent Capable Acres				
				Bolting Season Use			Utilization >45 percent	
	Capable Acres	Soil Condition Impaired or Unsatisfactory	Range Condition Low or Moderately-Low	Utilization >45%	Utilization <=45%	Any Utilization	Any Season Use	No Bolting Season Use
Chiricahua (25)	67	31	68	32	44	76	32	0.45
Dragoon (8)	52	49	16	63	17	80	63	
Galiuro (15)	28	31	2	33	32	65	50	17
Huachuca (26)	86	55	59		83	83		
Peloncillo (12)	94	52	11	84	1	85	97	13
Pinaleno (17)	59	44	17	29	47	76	53	24
Santa Catalina (8)	47	35	48		74	74		
Santa Rita (15)	70	29	18	17	59	76	25	8.5
Santa Teresa (6)	24	29	18	10	30	40	53	43
Tumacacori (14)	83	52	7	15	62	77	15	
Whetstone (2)	44	19	20		34	34		
Winchester (3)	21	11	3	74		74	74	
Total (151)	69	40	34	22	56	78		5

Cottonwood Creek, and a cave on private property. These sites represent locations where a few individuals have been recorded foraging and at temporary roosts, to at least two roosts with over 1,000 bats, and one roost with more than 3,000 bats. There have been on-going efforts to survey for lesser long-nosed bats in the general Chiricahua EMA, though not all potential roost sites have been found or investigated.

Dragoon EMA

One lesser long-nosed bat roost site is known in the central portion Dragoon Mountains, in a mine shaft. The only data available to the Service is from a single visit in 1994 when approximately 20+ bats were observed (including 13 bats which were captured and released). This EMA includes large areas of desert grassland, prime habitat for Palmer's agave. Surveys for lesser long-nosed bats in association with mines have been conducted within the Dragoon EMA. Additional surveys throughout the mountain range are still needed.

Galiuro EMA

There are no known lesser long-nosed bat roost records from the Galiuro EMA. There is one old specimen record for Redfield Canyon. We believe the Galiuro Mountains to provide suitable foraging habitat for the lesser long-nosed bat and possibly undiscovered roost locations. The Service is not aware of any intensive bat survey work completed in the Galiuro Mountains.

Huachuca EMA

Numerous records of lesser long-nosed bats are known from throughout the Huachuca EMA. Many thousands of bats have been documented at roosts in the Huachuca Mountains including those on National Park Service, Department of Defense Fort Huachuca, Forest Service, and private lands. Several large (1000's of bats) post-maternity roosts are found off-Forest within the Huachuca Mountains (on Fort Huachuca and Coronado National Memorial). Other large roosts in the Santa Rita Mountains and Patagonia area are within foraging flight distance of the Huachuca EMA. Fort Huachuca has conducted many surveys, monitoring studies, and other investigations. Annual peak numbers of lesser long-nosed bats observed roosting at Manila Mine have varied from 1,439 in 1993 (Sidner 1994) to 24 in 1990 (Sidner 1993). At Pyeatt Cave numbers have varied from 1 to 44 roosting lesser long-nosed bats (Sidner 1997). At Wren Bridge small numbers of lesser long-nosed bats have been observed night-roosting under the bridge. Roosting lesser long-nosed bats have been recorded at Fort Huachuca from late July into October. Numbers of bats typically peak in early September (Sidner 1996). A lesser long-nosed bat banded at Wren Bridge on Fort Huachuca was found the next night at the Patagonia Bat Cave, showing that individuals of this species move relatively long distances and bats foraging and roosting in the Huachuca EMA is part of a larger regional population (Howell 1996, Sidner 1996). Several studies have been conducted, and are currently underway on Coronado National Memorial. Howell (1996) suggests there are many potential roost sites in the Huachuca Mountains where hundreds of nectar feeding bats could roost without being detected. Lesser long-nosed bats have also been recorded form the vicinity of Canelo Hills, Turkey Creek, and the Patagonia Mountains, all considered to be in the Huachuca EMA.

Peloncillo EMA

Within the Peloncillo EMA and areas west to San Bernardino Ranch, there are a few records of lesser long-nosed bats. These records report two to four individuals per site. Within the Peloncillo Mountains there are recent reports from the Baker Canyon vicinity and a 1970 record from a cave in Guadalupe Canyon. Approximately 50 bats suspected to be *Leptonycteris* were reported from the Cowboy Flat area. In 1997, a biological opinion was completed for the Maverick Prescribed Burn which included a large portion of the Peloncillo Mountains. As part of that consultation, various investigations were conducted in the Peloncillo Mountains to address the question of the effects of fire on paniculate agaves and the use of agaves by bats. Occupied day roosts are known from the neighboring Chiricahua Mountains to the north, and Animas Mountains (in New Mexico) to the east. Slauson et al. (1998) reported very low rates of bat use of observed agaves in the Cowboy Flat area.

Pinaleno EMA

Though apparently suitable lesser long-nosed bat foraging habitat is found throughout the Pinaleno EMA, the Service is aware of only one record of a lesser long-nosed bat from this vicinity. A juvenile male was captured in the south end of the Pinaleno Mountains during the fall in 1986. The Service is not aware of any intensive bat survey work completed in the Pinaleno Mountains. The Pinaleno EMA is further than 64 km (40 mi) from any known lesser long-nosed bat roost.

Santa Catalina EMA

Both the Santa Catalina and Rincon mountains are included in this EMA. There are no recent records of lesser long-nosed bats in this EMA. However, there are old records of this bat being found in low numbers from a few scattered localities within the EMA, including on the Forest. Extant roost sites are known from private property next to the Forest. One roost on Saguaro National Park had many observational records where the numbers of lesser long-nosed bats fluctuated widely from year to year, from several hundred to zero. This may be a maternity colony (USFWS 1997b). The Santa Catalina and Rincon mountains are believed to provide suitable foraging habitat for the bat, especially on their lower and intermediate elevation slopes.

Santa Rita EMA

One lesser long-nosed bat roost site is known from the Santa Rita EMA. In addition, there are several records of foraging bats scattered within the EMA and vicinity. The roost, associated with Sawmill Canyon, has had up to several hundred bats present. Foraging bats have been reported using hummingbird feeders in Madera Canyon. Surveys completed for lesser long-nosed bat in the Santa Rita Mountains has not thoroughly covered the EMA. The large roost at

Patagonia Bat Cave is within close foraging distance of the Santa Rita EMA. Due to the distribution of past bat records, including large roosts which have now been abandoned (Cave of the Bells), the Service finds that the Santa Rita EMA provides foraging habitat for lesser long-nosed bats and suspects additional undiscovered roosts exist in the Santa Rita Mountains.

Santa Teresa EMA

There are no known lesser long-nosed bat records from the Santa Teresa EMA. The Santa Teresa Mountains are very rugged and are believed to provide suitable foraging habitat for the bat. The Service is not aware of any bat survey work conducted in this mountain range. The Santa Teresa EMA is further than 64 km (40 mi) from any known lesser long-nosed bat roost.

Tumacacori EMA

The Service is aware of only one lesser long-nosed bat record from within the Tumacacori EMA. This record is from June of 1959, in Walker Canyon, Pajarito Mountains. The closest known bat sites next to the EMA are near Patagonia, about 24 km (15 mi) from the EMA. Approximately the east half of the EMA is within the potential 64 km (40 mi) foraging distance of bats from their day roosts in the Patagonia area. Paniculate agaves are found throughout the EMA, and saguaro are at lower elevations. The EMA is believed to provide appropriate foraging habitat for lesser long-nosed bats. This EMA is located in the general geographic corridor between maternity colonies to the west and summer roost areas farther to the east. Little bat survey work has been completed in this rugged mountain complex.

Whetstone EMA

Red Cave, a major lesser long-nosed bat roost site occurs in the Whetstone EMA. The bat has been observed foraging in the Mustang Mountains south of the Whetstones. These bats are known to have traveled from roosts in the Huachuca Mountains to the Mustangs. The Whetstone Mountains are believed to provide suitable foraging habitat for the lesser long-nosed bat and possibly undiscovered roost locations. The Service is not aware of any intensive bat survey work completed in the Whetstone Mountains.

Winchester EMA

There are no known lesser long-nosed bat records from the Winchester EMA. Two lesser long-nosed bat observations have been recorded from the neighboring Galiuro and Pinaleno mountains. The Winchester Mountains are believed to provide suitable foraging habitat for the bat. The Service is not aware of bat survey work conducted in this mountain range.

Effects of the Action

The severity of adverse effects to *Leptonycteris* bats resulting from the potential reduction in forage resources is dependent on the importance of forage plants in a specific area to reproduction, survival, and growth of the bat. Each EMA, discussed individually below, is considered to varying degrees as foraging habitat for the lesser long-nosed bat. Several EMA's are also known to provide appropriate roost habitat. Areas with high densities of paniculate agaves and saguaros may be particularly important to these bats, especially if those high density sites are close to roosts. The distribution of agaves across the Forest has been estimated on a landscape level by evaluating the distribution of plant communities which include bat forage plants. However, the local abundance of these forage plants has not been included in this assessment. Given the ability of the bat to move freely and widely across the landscape, the large geographic scale of the analysis may be more meaningful to assess potential effects to the lesser long-nosed bat due to impacts to its foraging habitat by livestock. The effects of the proposed action are the sum of the effects for all allotments under consideration. When an individual allotment is evaluated for effects to the lesser long-nosed bat, a "not likely to adversely affect" determination may be the result due to the bat's mobility. However, using the EMA as the basic unit of analysis, the evaluation of effects can be assessed at a landscape scale, similar to the way in which the bat interacts with its habitat.

The Coronado has committed to not disturbing or modifying any bat roost sites on any allotments (USFS 1998c), although the Forest does not detail how such effects will be avoided. Range project construction is also implemented so that no more than one percent of agaves and saguaros within 800 m (0.5 mi) of the project are affected. Undetected roosts probably occur within various allotments, possibly in each EMA. In addition, some old records of roost sites for lesser long-nosed bats have not been re-surveyed for 20 or more years. Direct disturbance or modification of these roosts could occur because of range project construction or indirectly because of recreationists accessing roost sites on roads constructed or maintained as part of the grazing program.

Indirect effects from livestock grazing to *Leptonycteris* bats may occur through adverse effects to forage plants, primarily paniculate agaves and saguaros. Impacts to forage plants through implementation of the range management program may occur through direct herbivory and trampling by livestock, alteration of the vegetation community, degradation of soil and watershed conditions, modification of the fire regime, and range projects. The Forest has provisions in place to reduce effects to agaves from construction and maintenance activities associated with grazing management. Prescribed fire, herbicide application, and seeding of non-native plants are not part of the proposed actions. As these types of projects are proposed, they will be addressed under site-specific consultations.

Saguaros may be impacted both directly and indirectly by grazing activities. Saguaros occur on slopes, bajadas, and in valleys. Impacts due to livestock grazing activities may occur from trampling of young saguaros, grazing of nurse plants which results in reduction or removal of protective cover, or grazing of the young saguaros themselves (Abouhalder 1992). Nurse plants, which shade sensitive saguaro seedlings, may be reduced by grazing, and germination sites may be adversely altered due to soil compaction, erosion, and reduced infiltration. Livestock seek shade under trees, and forage for annual vegetation within shrub and tree cover. Benson (1982) noted that grazing that has obliterated seedbeds of saguaros. Neiring et al. (1963) found that enhanced reproduction of saguaros on slopes was correlated with reduced localized levels of grazing. Across the Forest, saguaros occur in varying densities on the lower slopes of the mountains of the western EMA's, especially the Tumacacori and Santa Catalina EMA's. However, by mid-summer when most bats arrive on the Forest from maternity roosts farther to the west, saguaros have completed flowering and no longer provide a food source for the lesser long-nosed bat.

The primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall is Palmer's agave, which typically occurs on rocky slopes or hill tops, scattered within the desert grassland and oak woodland communities within the elevation range of 900 m to 1,800 m (3,000-6,000 ft) (Gentry 1982). Parry's agave reaches higher elevations than Palmer's, extending from grasslands into oak woodland, chaparral, pine/oak forests, and mixed conifer with an elevation range of approximately 1,500 m to 2,500 m (4,900-8,200 ft) (Gentry 1982). Like Palmers' agave, Parry's is typically found on rocky slopes (Gentry 1982). Concentrations of paniculate agaves are generally found on the rocky, shallow soils of hills and ridges. Palmer's and Parry's agaves are also found scattered in areas of deep, heavy soils within grasslands or where there may be thick stands of shrubs, mesquite, oak, and other trees.

The ecology of Palmer's agave appears to be poorly understood, especially as it is affected by livestock use and fire (Slauson, pers. comm., 1997; Wendy Hodgson, Desert Botanical Gardens, Phoenix, pers. comm., 1997). Agaves are perennial succulents. Agave seeds germinate readily with adequate moisture, typically in open areas with limited competition from other plants (Tony Burgess, Biosphere Two Center, Tucson, pers. comm., 1997). Palmer's agave is relatively slow growing, often taking 20 or more years before initiating the single reproductive event in its life (Slauson 1996, 1999). A flowering stalk erupts from the rosette of a mature plant, growing rapidly through the spring and early summer. During the summer 8 to 12 flowering panicles are displayed on the upper third of a stalk, 3 to 5 m (10-16 ft) tall (Gentry 1982). Slauson (1996, 1999) has completed a pollination ecology study of Palmer's agave, finding that many pollinator species contribute to establishing seed set. Lesser long-nosed bats have been recorded visiting individual blooming Palmer's agaves more than 1,000 visits per night (R. Sidner, Tucson, pers. comm., 1997; Petryszyn, pers. comm., 1999), while they may not visit other agaves at all (Slauson, pers. comm., 1997). Bat visits generally last less than one second (Slauson 1999). Apparently there are many factors which influence the year a particular plant may bloom. Precipitation one to several years before blooming is probably of special importance. In the Peloncillo Mountains, about 2 to 5 percent of the agave population flowers each year (Peter Warren, Nature Conservancy, Tucson, pers. comm., 1997). Palmer's agave may occasionally produce off-sets (vegetative reproduction or cloning of "pups" produced from rhizomes) though this is less likely than for many other agave species (Hodgson, pers. comm., 1997). Parry's agave freely produces off-sets (Gentry 1982).

The importance of Parry's agave, as well as desert agave and amole, as a forage resource for *Leptonycteris* bats is unknown. As discussed, Parry's agave generally occurs at higher elevation than Palmer's agave, and occurs in forest openings. Benson and Darrow (1982) note that it typically flowers in June and early July, which is before the lesser long-nosed bat arrives at roosts in southeastern Arizona. However, J. Rorabaugh (Arizona Ecological Services Field Office, pers. comm., 1998) noted many Parry's agave in flower high in the Huachuca Mountains on the crest trail during late July in 1997. It may be that agaves at high elevation bloom later than at lower sites, and could potentially be blooming and be used as a forage resource when lesser long-nosed bats arrive in July or early August. In addition, Parry's agave may be very important as a forage plant for those bats which arrive in southeastern Arizona during late spring and early summer.

No long-term investigation has quantitatively documented the effect of grazing on agave mortality or flowering stalk herbivory. Individual paniculate agave plants only bloom once in their life of about 20 years. However, agave stalks are rich in carbohydrates, and as they begin to bolt are particularly palatable to domestic livestock and wild herbivores, including deer, javelina, rodents, and rabbits (Howell 1996; M. Hawks, University of Arizona, pers. comm., 1997; Hodgson, pers. comm., 1997). The desirability of these stalks in early spring is likely influenced by availability of quality forage in the area. Under conditions of inadequate precipitation to facilitate a spring green-up, especially when high levels of utilization are reached or following range fires, cattle as well as local wildlife may seek out agave stalks (Tricia Roller, Arizona Ecological Service Field Office, pers. comm., 1997). Cattle have been known to "walk down" agave flowering stalks (T. Cordery, Arizona Ecological Services Field Office, pers. comm., 1998). Cattle probably trample young agaves, causing some level of mortality among these plants. Agave germination and seedling establishment may be influenced by degraded ecological conditions such as soil compaction, erosion, reduced infiltration, and altered plant species composition. Effects on bat forage plants due to livestock grazing are expected to be more intense where livestock congregate near water sources and less intense on steep slopes or among rocks where grazing is generally lighter and agaves are at higher densities.

Livestock management practices (past and present) and non-native plant introductions have contributed to changes in the natural dynamics and composition of vegetation communities (Fleischner 1994), as has past fire control policies. For an overview of livestock management effects to natural ecosystems see the general effect's discussion earlier in the biological opinion. How past land management activities have affected the agave distribution and abundance present today is unclear, as are the potential effects of fire in an altered system.

Effects of livestock grazing on fire frequency and intensity, and subsequent effects to agaves and floral resources for bats are complex. Before about 1900, widespread surface fires occurred in the Madrean borderlands. These frequent ground fires ceased to occur about the time intensive livestock grazing began (Swetnam and Baisan 1996). Although other factors likely played some role in the elimination of frequent ground fires, most authors agree that livestock grazing was probably the most important, at least before effective fire suppression began in the 1930's (Bahre 1991, 1995, Swetnam and Baisan 1996, Danzer et al. 1997). Livestock grazing removes dried herbaceous fine fuels that normally carry fire. Without fire, ladder fuels and woody material build up in woodlands. The result is that when fires finally do occur, they can be catastrophic and stand-replacing (Danzer et al. 1997). How this change in fire frequency and intensity caused in part by livestock grazing effects agave populations is unknown. In the absence of frequent ground fires, agave populations could potentially benefit due to reduced mortality resulting from fire. However, infrequent intense fires could kill greater percentages of agaves when fires occur, if agaves are growing amid brush or other areas of high fuel loads.

Other factors are important in determining the effects of livestock grazing on fire regimes and subsequent effects to agaves and floral resources. Activities that directly or indirectly promote invasions or increased density of nonnative grasses, particularly Lehmann lovegrass, may result in increased fire frequency or intensity, reduced densities of Palmer's agave, and thus reduced floral resources for the lesser long-nosed bat. Lehmann lovegrass is abundant in some portions of the Forest, especially the Tumacacori, Huachuca, Santa Rita, and Santa Catalina EMA's and its relative abundance has been positively correlated with livestock grazing intensities (Anable et al. 1992, McClaran and Anable 1992). This species increases after fire (Martin 1983, Ruyle et al. 1988, Sumrall et al. 1991, Howell 1996), but also produces an abundance of fine fuel that promotes hot fires (McPherson 1995). Thus, frequent fire is likely to increase the abundance of Lehmann lovegrass, and increased abundance of this grass can fuel more fires and hotter fires, creating a positive feedback loop (Anable et al. 1992). Frequent, hot fires caused by prescribed fires and increasing prevalence of Lehmann lovegrass could reduce densities of Palmer's agave. In an ungrazed setting at Fort Huachuca, Howell (1996) found that Lehmann lovegrass creates areas of continuous fuels that burn at a constant temperature versus stands of native grasses that are patchy regarding fuels and fire intensity. Agaves can persist in fire-prone native grasslands in bare areas or refugia that burn lightly or not at all. Such refugia are less common in Lehmann lovegrass stands. Howell (1996) also noted a negative relationship between the proportion of agave seedlings and ramets and the amount of Lehmann lovegrass. She suggested that Lehmann lovegrass appears to suppress agave recruitment independent of the fire effects just described. The mechanism of suppression is unclear, but Howell (1996) suggests Lehmann lovegrass may compete effectively with agaves for nutrients, moisture, or light. If agave densities are reduced due to elevated fire effects or recruitment suppression caused by Lehmann lovegrass invasion, forage resources of the lesser long-nosed bat will be reduced. Agaves in desert grasslands have evolved with fire, but unnatural, high fire frequency can lead to decline or elimination of agave populations (Howell 1996). Howell (1996) found that a fire frequency of three to six per decade on Fort Huachuca is "clearly too high to allow sexual reproduction to persist in the agave community... too high to permit seedling establishment and too high to allow even the fast growing clones to achieve reproductive status."

Agave mortality due to fire may affect the abundance and distribution of blooming agaves on the landscape for many years into the future, especially if there is high mortality within certain age and size classes. Although fire may affect the availability of blooming agaves, the nectar production and sugar content of surviving plants is little effected. Working in the Peloncillo Mountains, Slauson et al. (1998) found that nectar production and sugar content did not differ between unburned agaves and burned agaves that did not have greater than 80 to 90 percent of the leaf area burned. The complexity of variables influencing agave flowering may mask the effects of a fire on agave flowering for several years after a fire. In addition, natural recruitment of agaves may be very episodic and the effects of fire on the agave seed bank in the soil are unknown. Livestock grazing, especially at high utilization levels, often promotes the increase of non-native and less-palatable species, which may influence the resulting fire regime. Often the objectives of livestock management are to increase the abundance of grasses while the direct impacts of livestock herbivory are the reduction of grass cover. Grasses are probably one of the strongest competitors with agave seedlings (Burgess, pers. comm., 1997). Increased abundance of grass could result in reduced agave abundance. When overgrazing results in declines of perennial grasses (Martin and Cable 1974, Eckert and Spencer 1987), there may be less competition between grasses and agaves. However, there may also be increased trampling of smaller agaves by livestock, and increases in woody/shrub vegetation results in an altered fire regime.

The factors that are important to *Leptonycteris* bats are the availability of agave flowering stalks, each and every year. In southeastern Arizona, Palmer's and Parry's agaves are the only reliable food source for long-nosed bats in mid to late summer. However, agaves are patchily distributed over the landscape and the presence of flowering agaves naturally fluctuates from year to year. Nectar feeding bats are opportunistic foragers, taking advantage of local floral resources. During the breeding season lesser long-nosed bats may fly great distances in search of food resources, and later in the season they may shift roost sites and foraging areas based on the presence (or absence) of flowering agaves (Petryszyn, pers. comm., 1997). The distance the bats will forage from a roost site appears to be related to the size of the colony and the available floral resources (V. Dalton, pers. comm., 1997; Petryszyn, pers. comm., 1997). Lesser long-nosed bats are generally present in southeastern Arizona after the bats have left their maternity colonies and migrated to southeast Arizona and southwest New Mexico in mid to late summer when agaves are in flower.

Effects to *Leptonycteris* bats occur through direct herbivory and trampling of agaves, alterations of species composition of the community, disruption of ecosystem functions, alteration of ecosystem structure, and the related effects on agaves. Agaves have persisted on the landscape (and sometimes may have even increased) over the course of more than a century of livestock use on the landscape. It has been observed by Slauson (pers. comm., 1999) that overgrazing is detrimental to agaves. Nevertheless, what level is considered overgrazing? A review of the literature by Holechek et al. (1998) shows that grazing in southwestern habitats is sustainable, but at moderate levels of utilization. Utilizations levels must be managed to maintain critical dry matter residue on the ground to protect the soil, and maintain forage plant vigor, wildlife habitat, and a natural fire regime. Utilization levels recommended by Holechek et al. (1998) for semiarid grasslands range from 25 percent to a maximum of 40 percent in the best, most easily managed area (e.g., flats). A major concern is the frequency of drought conditions in the Southwest. Overgrazing often accompanies drought conditions when stocking levels cannot be quickly reduced to match the limited forage production. Periodic overgrazing can damage range resources (Eckert and Spencer 1987) and have long-term negative effects. The Forest does have a drought management policy, though the decision of how to manage under drought conditions is left to the District Ranger in cooperation with the range specialist and the permittee.

Grazing utilization levels over 40 percent are considered damaging to the ecosystem (Martin 1975, Eckert and Spencer 1987, Holechek et al. 1998). How these or other specific levels of utilization are directly correlated to effects on agaves is not known. However, as utilization levels or stocking levels increase, effects to the vegetation community and agaves also increase. No information is available on the relationship of grazing management systems and utilization levels to the associated effects on agaves. The Forest has initiated and is committed to completing a multi-year study on agave ecology and the relationships to livestock management. This type of information is needed to make fully informed decisions regarding the effects of livestock management to the lesser long-nosed bat. Until this information is available, the Forest should be careful not to preclude management and conservation options for the bat. The effects that livestock are having today on the landscape are manifest in changes in the ecosystem for years and decades to come. The effects of livestock use today on seedling agaves will not be manifest to the bat for 20 or more years, when those plants would be reaching maturity and bolting. The effect of livestock today through herbivory on bolting agaves results in immediate reductions of forage resources available to *Leptonycteris*.

Central to the issue of evaluating adverse effects due to livestock impacts to forage plants of post-breeding *Leptonycteris* bats is the question, are agave floral resources potentially limiting to the bat? This was a major topic of a meeting among the Forest, Service, and consultation applicants early in 1999. Various bat and agave species experts participated in this meeting. Though there were many perspectives on this subject, one answer appears clear, there are very little data. Limited information is available on bat foraging ecology and energetics, as well as the relation of livestock use to agave mortality, and weather parameters to agave bolting. Though many, many paniculate agaves are present across the landscape, it is not understood if all these are equally available and desirable to the bat. Slauson (pers. comm, 1999) believes that agave nectar is not limiting to lesser long-nosed bats. This conclusion is based on her pollination biology study of Palmer's agave (Slauson 1999) in which bat visitation and quantities of available nectar were monitored. Nighttime observations were conducted at several sites for a total of over 15 hours of periodic observations. In addition, floral nectar was always abundant at her sites and not depleted by pollinators. Slauson (1999) discussed possible factors related to the lack of observed bat visitations: 1) during stormy or windy weather, bat foraging distances and activity may decrease; 2) sufficient food resources for the number of bats present may have been available closer to the roost; and 3) other foraging sites may have been preferred. Some of the observation sites were in areas where *Leptonycteris* bats are widely dispersed. The relationship of foraging areas to roost sites, especially large roosts, is important in land management decisions. Availability of large roost sites is considered a major limiting factor to the bats (USFWS 1997b). Affecting forage resources in proximity to roosts may affect a substantial portion of the bat population in Arizona, and may affect the desirability of a particular roost site.

In summary, superimposing the potential effects of livestock use as it affects the availability of floral resources, adult plant mortality, and seedling mortality, upon the natural variability in agave phenology, episodic reproductive events, and patchy distribution on the landscape, grazing may affect agaves and nectar feeding bats in a variety of ways. *Leptonycteris* bats are opportunistic foragers and are capable of long distance flights. Temporary and minor shifts in the abundance of flowering agaves as an available resource for these bats are expected to have limited adverse effects. However, as these impacts to lesser long-nosed bat food resources occur across large portions of the landscape, as analyzed through the EMA's on the Coronado NF, bat survivorship may be reduced through increased foraging flight distances and related energy expenditures, increased exposure to predators, changes in use patterns of limited large roost sites, and potential disruption of the "nectar corridor." These effects may be most evident in those years where weather patterns, fire, or other causes have also affected agaves. The long-term effect of livestock use contributes to ecosystem based changes. The net result is that there are effects from livestock activities across the landscape to the ecosystem upon which the lesser long-nosed bat depends. Exactly how this alters the distribution and abundance of agaves, and to what degree this may impact lesser long-nosed bat populations is uncertain.

Evaluation of Effects by EMA

Chiricahua EMA

Numerous bat roosts are present within and next to the Chiricahua EMA. Three roosts are known to have supported at least 1,000 bats each, though the number of bats have fluctuated substantially from year to year. This area is also the location for the earliest known springtime arrival of bats in southeastern Arizona. Over 67 percent of the EMA is considered capable and managed under grazing allotments. While grazing is permitted on 76 percent of the capable acres at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 32 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Over the EMA as a whole, 31 percent of the area is in impaired or unsatisfactory soil condition and 68 percent is in low or moderately low range condition. The combination of very high utilization rates, large areas of the landscape potentially being grazed during the agave bolting period, and large area of degraded ecological conditions, the effects of livestock use at the levels and timing indicated may affect the lesser long-nosed bat within this EMA and may inhibit (delay or preclude) the species' recovery potential in this area.

Dragoon EMA

Approximately 52 percent of this EMA is considered capable. While grazing is permitted on 80 percent of the capable area at some time during the agave bolting season, the actual number of acres grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 63 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Soil condition of 49 percent of the total EMA is impaired or unsatisfactory; range condition is low or moderately low on 16 percent of the acres. A single, relatively small lesser long-nosed bat roost is known from the EMA. Much of this EMA is in moderately high range condition and there are relatively few bats known from the area of the EMA. The Dragoon Mountains include extensive areas of agave habitat and additional surveys are needed. The recovery potential of lesser long-nosed bat within the Dragoon EMA may be delayed.

Galiuro EMA

The Galiuro Mountains are rugged and steep. Only 28 percent of the EMA is considered capable. While grazing is permitted on 65 percent of the capable area at sometime during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 50 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Only one lesser long-nosed bat record is known from this EMA. Therefore, due especially to the low percentage of capable area and lack of bat presence, the proposed action in this EMA is not expected to adversely affect the lesser long-nosed bat.

Huachuca EMA

The Huachuca EMA is of vital importance to the conservation of the lesser long-nosed bat. Many bat roosts large and small are within or immediately next to the Huachuca EMA. Further, the Huachuca EMA is within foraging distance and documented foraging use from the largest and most important post-maternity bat roosts in southeastern Arizona. Approximately 86 percent of the EMA is managed under grazing allotments as capable area. While grazing is permitted on 83 percent of the capable area at sometime during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Across the entire EMA, 55 percent of the area is in impaired or unsatisfactory soil condition and 59 percent is in low or moderately low range condition; the trend is generally static. All grazing allotments have a 45 percent utilization rate (measured at key areas). Based on the lack of improving range condition over large areas of the landscape that are being grazed during the agave bolting period, and the effects of livestock use at the levels and timing indicated, the proposed action may affect the lesser long-nosed bat within this EMA and may inhibit (delay or preclude) the species' recovery potential within this area.

Peloncillo EMA

Approximately 94 percent of the Peloncillo EMA is managed as capable. While grazing is permitted on 85 percent of the capable area at sometime during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 97 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Of the total EMA, 11 percent is in low or moderately low range condition and 52 percent has impaired or unsatisfactory soil condition. There are several records of lesser long-nosed bats using this area. These records seem to indicate that bat presence within this EMA is more than incidental, but no substantial roosts are known from the area. Several agave and bat research and monitoring projects are underway within the Peloncillo EMA. Therefore, until these projects identify specific areas of concern for the bat, detect important numbers of bats using the area, or range conditions become degraded, the proposed grazing actions within the Peloncillo EMA will not substantially affect lesser long-nosed bat survivorship, though livestock management activities may delay *Leptonycteris* recovery potential within this area.

Pinaleno EMA

The Pinaleno EMA includes 59 percent capable area. While grazing is permitted on 76 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 53 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. About 17 percent of the EMA is classified as low or moderately low range condition, and 44 percent of the EMA is ranked as impaired or unsatisfactory soils. Only one lesser long-nosed bat record is known from this EMA. All available information suggests this area receives only incidental use by lesser long-nosed bats. Effects of the proposed action in this EMA are not expected to negatively affect survivorship of the lesser long-nosed bat.

Santa Catalina EMA

Approximately 47 percent of the Santa Catalina EMA is considered capable. No allotments receive greater than 45 percent utilization (measured at key areas). While grazing is permitted on 74 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Stands of saguaro are present on the lower slopes of the Santa Catalina and Rincon mountains. Documented bat use within the EMA and immediate vicinity consists of a few, mostly old records. However, on the neighboring Saguaro National Park in the Rincon Mountains, there is a suspected maternity roost. Due to the moderate degree of designated capable area and no allotments exceeding 45 percent utilization, the proposed action in the EMA is not expected to negatively affect survivorship of lesser long-nosed bats. Current livestock management may delay maximum recovery potential for the bat within this area.

Santa Rita EMA

Approximately 70 percent of the Santa Rita EMA is classified as capable. While grazing is permitted on 76 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 25 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Range condition is rated as low or moderately low for 18 percent of the total EMA; soil condition is ranked as impaired or unsatisfactory on 29 percent of the EMA. Lesser long-nosed bat occurrences have been recorded from scattered localities within the EMA, and the EMA is within close foraging distance of the large bat roost in the Patagonia area. Though range condition is generally acceptable, the combination of high utilization levels and agave bolting season use may affect saguaros and agave flowering stalk abundance and distribution to the extent that survivorship of lesser long-nosed bats associated with the EMA and vicinitymay be adversely affected. In addition, the proposed livestock management may inhibit (delay or preclude) the recovery potential for the bat in this area.

Santa Teresa EMA

The Santa Teresa Mountains are very rugged. Only 24 percent of the EMA is considered capable. While grazing is permitted on 40 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 53 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Range condition is rated as low or moderately low for 18 percent of the total EMA; soil condition is ranked as impaired or unsatisfactory on 29 percent of the EMA. No lesser long-nosed bat records are known from this EMA. Therefore, due to the low percentage of capable area and lack of bat presence, the proposed action in this EMA is not expected to negatively affect survivorship of the lesser long-nosed bat.

Tumacacori EMA

Approximately 83 percent of the Tumacacori EMA is managed as capable. While grazing is permitted on 77 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 15 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Range condition over the entire EMA is classified as low or moderately low for three percent of the area; soil condition is impaired or unsatisfactory on 11 percent of all area. Only one lesser long-nosed bat has been recorded from this EMA, though it is within foraging range of several large roosts. Due to the very low percentage of degraded range conditions and the lack of a documented presence of bats, the proposed livestock grazing actions in this EMA are not expected to negatively affect survivorship of the lesser long-nosed bat. However, due to the degree of area exposed to grazing during the agave bolting season and the location of this EMA in a potential migration corridor of the lesser long-nosed bat, the proposed action may delay the recovery potential for the bat.

Whetstone EMA

The Whetstone EMA has approximately 44 percent of all area classified as capable. While grazing is permitted on 34 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. No allotment receives more than 45 percent utilization (measured at key areas). Range condition is rated at low to moderately low over 20 percent of the EMA, and soil conditions are impaired or unsatisfactory over 19 percent of the EMA. One major lesser long-nosed bat roost is known from this EMA. Due to the lack of utilization levels over 45 percent and limited area exposed to grazing during the agave bolting period, the effects of the proposed action in this EMA are not expected to negatively affect survivorship of the lesser long-nosed bat.

Winchester EMA

Approximately 21 percent of the Winchester EMA is managed as capable. While grazing is permitted on 74 percent of the capable area at some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 74 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, other areas less. Of the total EMA, three percent is in low or moderately low range condition and 11 percent has impaired or unsatisfactory soil condition. There are no records of lesser long-nosed bats using this area. The proposed grazing actions within the Winchester EMA are not expected to negatively affect lesser long-nosed bat survivorship.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline. Much of the land in the project area of concern for the lesser long-nosed bat (foraging and roost habitat) is managed by Federal agencies, particularly the Forest, Bureau of Land Management, Coronado National Memorial, and Fort Huachuca.

On a landscape level, paniculate agave populations appear to be well dispersed. However, the percentage of the agave population which successfully produces flowering stalks is unknown. Large segments of the range of the lesser long-nosed bat and its forage plants are exposed to Federal, State, Tribal, and private livestock grazing management activities. The overall effects of grazing (herbivory, trampling, and ecosystem changes affecting plant reproduction, recruitment, and establishment) on bat forage plants is unknown. *Leptonycteris* bat foraging ecology and energy budget is largely unknown. This, combined with potential disturbance of roost sites and loss of habitat due to urbanization and other activities on large tracts of State and private lands within the range of the bat, contributes to negative impacts on lesser long-nosed bats. The effects of all these actions are considered cumulative to the proposed action.

Conclusion

After reviewing the current status of the lesser long-nosed bat, the environmental baseline for the project area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the ongoing and long term grazing activities on the Coronado NF are not likely to jeopardize the continued existence of the lesser long-nosed bat. No critical habitat has been designated for this species; therefore, none will be affected. Our conclusion that the proposed action is not likely to jeopardize the species is based on the following:

1. The Coronado NF included mitigation measures in the proposed action to avoid destruction of agaves and disturbance of lesser long-nosed bat roosts during construction of range projects.

2. Although the proposed action covers a large portion of the post-breeding range of the lesser long-nosed bat, and adverse effects to agaves, a crucial forage resource, are anticipated, the effects are not anticipated to substantially reduce or impact post-breeding populations of the bat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that lesser long-nosed bats could be taken because of the proposed action as follows:

1) All bats in one roost of any size because of one incident of harassment due to recreationists using roads created or maintained for the grazing program to reach the roost.

2) 100 lesser long-nosed bats due to harm resulting from reduction of forage resources caused by impacts of grazing activities on agaves or saguaros within the Chiricahua, Huachuca, and Santa Rita EMA's.

The Service anticipates incidental take of lesser long-nosed bat as a result of harm (#2 above) will be difficult to detect because finding a dead or impaired specimen is unlikely, and attributing the death or injury to the grazing program will likely be impossible. However, the level of take anticipated in the form of harm could be detected either by finding bats taken as a result of the grazing program, or if the following surrogate conditions are met:

1. The Coronado NF does not implement the action as proposed regarding maximum utilization limits for allotments within the Chiricahua, Huachuca, or Santa Rita EMA's. This condition is considered to be met if utilization levels (measured at key areas) are exceeded (at any level) for any pasture more than three times on one allotment within three years, or if at any time utilizations levels (measured at key areas) are exceeded by 20 percent in any pasture.

2. The result of any research confirms that floral resources are a limiting factor for the lesser long-nosed bat in the project area and that grazing activities as proposed reduce those resources.

This biological opinion does not authorize any form of take not incidental to implementation of the Coronado NF grazing program. If the incidental take authorized by this opinion is exceeded, the Forest must immediately reinitiate consultation with the Service to avoid a violation of section 9 of the Act. Meanwhile, the Forest must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species. The Forest should provide to this office an explanation of the cause of the taking.

EFFECT OF THE TAKE

In this biological opinion, the Service finds the anticipated level of take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of lesser long-nosed bat:

1. The Coronado shall coordinate with the Service to ensure that project-level activities within 1.6 km (1 mi) of known roosts are designed to minimize take of lesser long-nosed bat.

2. The Coronado shall minimize disturbance to agaves and saguaros.

3. The Coronado shall monitor grazing activities and incidental take resulting from the proposed action and report to the Service the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Coronado must comply with the following terms and conditions in regard to the proposed action. These terms and conditions implement the reasonable and prudent measures described above. Terms and conditions are nondiscretionary. Terms and conditions apply to allotments under consultation in the Santa Rita, Huachuca, and Chiricahua EMA's that contain lesser long-nosed bat roosts, or provide foraging habitat within foraging range of significant roosts,.

1. The following term and condition implements reasonable and prudent measure number one:

The Forest shall develop a mitigation plan in coordination with the Service for each range project or road maintenance action undertaken as part of the grazing program, within 1.6 km (1 mi) of any known roost. The purpose of the mitigation plan shall be to minimize disturbance to the roosts from construction and maintenance activities and to ensure that such activities do not facilitate public access to roosts.

2. The following term and condition implements reasonable and prudent measure number 2:

Structural range project construction is implemented so that no more than one percent of agaves (*A. palmeri* and *A. parryi*) or saguaros within 800 m (0.5 mi) of the project are affected.

3. The following terms and conditions implement reasonable and prudent measure number 3:

The Forest shall submit an annual report to the Arizona Ecological Services Field Office. The report shall, at a minimum, briefly summarize for the previous calendar year: 1) the implementation of terms and conditions and conservation recommendations, 2) documentation of take, and 3) any excessive use, increased animal months, unauthorized use, or other detrimental variations from the proposed actions. If other monitoring or research is completed pertaining to the lesser long-nosed bat or conditions of grazed lands, include a summary or copy of the relevant reports. Include any records of lesser long-nosed bat, and evaluations of bat habitat. The report shall also make recommendations for modifying or refining these terms and conditions to enhance protection of the lesser long-nosed bat or reduce needless hardship on the Forest and its permittees. Refer to the General Term and Condition for report submittal.

Note: The Service provides herein no terms and conditions beyond measures agreed to by the Forest in the proposed action in regard to protection of agaves and saguaros. This is because of uncertainties concerning the effects of livestock grazing on agave populations and whether floral resources are limiting to the lesser long-nosed bat. Nevertheless, the Service is concerned about potential adverse effects to the ecosystem upon which the bat depends, and to agaves and saguaros, as reflected in the lesser long-nosed bat recovery plan and in the following conservation recommendations, which stress the importance of protecting those resources.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the lesser long-nosed bat. The Service and appreciates that the Forest is undertaking and funding a significant research and monitoring program on agave demography and effects of grazing on agave and other resources. The following recommendations are intended to complement the ongoing Forest efforts. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The Forest should continue (expand) cooperative efforts to survey for *Leptonycteris* bat roosts, and protect and monitor these sites (Recovery plan task 1, USFWS 1997b).

2. The Forest should monitor livestock utilization within all pastures used during the agave bolting season of the allotments listed in Table 14, but especially within the Chiricahua, Huachuca, and Santa Rita EMA's (Recovery plan task 2, USFWS 1997b).

3. The Forest should investigate and monitor the invasion of Lehmann lovegrass on the Forest and assist other agencies in developing methods for controlling this nonnative grass (Recovery plan task 2, USFWS 1997b).

4. The Forest should apply a maximum grazing utilization limit of 40 percent (or less) within the Chiricahua, Santa Rita, and Huachuca EMA's to emphasize management for lesser long-nosed bat forage resources and the protection and recovery of the species (Recovery plan task 2, USFWS 1997b).

5. The Forest should apply a maximum grazing utilization limit of 40 percent (or less) across the entire Forest to facilitate ecosystem health and emphasize the recovery of the lesser long-nosed bat (Recovery plan task 2, USFWS 1997b).

6. The Forest should apply restrictions on the exposure of bolting agaves to livestock use Forest-wide, so that no allotment has more than 50 percent of capable area accessible to livestock during the agave bolting period (April 15 through September 15) during any one year (Recovery plan task 1, USFWS 1997b).

7. The Forest should continue support and cooperation in the investigations of agave relationships to livestock grazing, and of the effects of prescribed fire on paniculate agaves (Recovery plan task 1, USFWS 1997b).

8. The Forest should implement the lesser long-nosed bat recovery plan, as appropriate.

In order for the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

(Note: Surveys for lesser long-nosed bats, or other bats, that involve capture or take require appropriate permits from the Service and Arizona Game and Fish Department.)

MEXICAN LONG-NOSED BAT (*Leptonycteris nivalis*)

Status of the Species

The Mexican long-nosed bat was listed as endangered on September 30, 1988 (USFWS 1988a). No critical habitat has been designated for this species. The recovery plan was completed in 1994 (USFWS). The Mexican long-nosed bat is a medium-sized bat with an elongated snout and a small, prominent, triangular noseleaf on the tip. These bats have a long, protruding tongue with inward-pointing, elongated papillae at the tip. Long-nosed bats feed on nectar and pollen of agave and cactus flowers, some soft fruits, and perhaps, incidentally, insects associated with flowers. Diagnostic characters include the long snout and tongue, minute tail, and hairs extending beyond the edge of the interfemoral membrane.

Mexican long-nosed bats are known from 500 to 3,000 m (1,550-9,300 ft) elevation in northern and central Mexico, southwestern Texas, and southwestern New Mexico. They inhabit desertscrub, open conifer-oak woodlands, and pine forest habitat in the Upper Sonoran and Transition Life Zones. The species is colonial and usually roosts in caves but can also be found in mines, culverts, and hollow trees. There are no references in the literature to roosts that are occupied year-round nor whether seasonally occupied roosts are occupied by the same colony when they return. A particular colony may use one or more winter roosts, several migratory roosts, and still other summer roosts. Food resource availability probably drives this species' migratory movements which might be tied to taking advantage of peaking food sources. For example, the species' use of a roost in Big Bend National Park may reflect use in years when flower production is low in Mexico. Possible food plants include columnar cacti such as the cardon (*Pachycereus pringlei*) and paniculate agaves (*Agave* spp.). The migratory path and nature of the species is not well known.

The current population size is difficult to estimate. Mexican long-nosed bat populations appear to have dramatically decreased during the last three decades. A 1985 survey of 14 known roost sites resulted in a determination of very small numbers of this species. Causes of the decline have not been identified with complete certainty, but they probably relate to human activities. Modification or destruction of roost sites and foraging habitat are probably the major threat. Other threats may include pesticides, competition for roosts and nectar, natural catastrophes, disease, and predation. As with other colonial roosting bats, Mexican long-nosed bats are probably limited by the number of sites that provide the proper roosting environment especially for parturition. While no known Mexican long-nosed bat roosts have been rendered unusable, roosting caves are generally becoming increasingly subject to human destruction and disturbance. This species is particularly sensitive to perturbation of the roost. Foraging habitat disruption and destruction has also been identified as a threat. Foraging habitat can be modified or destroyed by harvesting of agave, expansion of agriculture, and other land uses.

Environmental Baseline

The Forest requested formal consultation on the effects of livestock management to the Mexican long-nosed bat for 12 grazing allotments. These allotments are found only in the Peloncillo EMA, the only EMA considered to be within the geographic vicinity where the Mexican long-nosed bat has been found. See Table 14 for the names of these allotments in the Peloncillo EMA (the Forest also made “likely to adversely affect” determinations for these same allotments for the lesser long-nosed bat).

Potential foraging habitat for the Mexican long-nosed bat on the Forest is found only in the Peloncillo EMA. Palmer’s agave is the primary suspected food source for this bat in southeastern Arizona and southwestern New Mexico.

Status of the Species in the Project Area

The Mexican long-nosed bat is only being considered in the Peloncillo EMA. No records of this species are known from Arizona, and the nearest suspected roost is in the Animas Mountains. The Peloncillo Mountains are considered to be within foraging flight distance of the Animas Mountains. The Peloncillo EMA provides appropriate foraging habitat (agaves) for the Mexican long-nosed bat. The New Mexico locality is over 640 km (400 mi) disjunct from the Texas locality and over 703 km (437 mi) from the northernmost record in central Sinaloa, Mexico.

Two specimens taken in Hidalgo County (in 1963 and 1967) in southwestern New Mexico were recently determined to be Mexican long-nosed bats (USFWS 1994). The species presence was recently confirmed when individuals were netted over a tank in Hidalgo County on August 26, 1992. A roost site has not yet been found and the status of the New Mexico population has not been determined. The capture location of the above individuals is relatively close to the Peloncillo EMA. Roost habitat is apparently available in the Animas Mountains and perhaps in the Peloncillo Mountains. The distance of less than 40 air km (25 mi) between the Animas and Peloncillo mountains is within the foraging flight distance of this strong flier. The Peloncillo Mountains may provide suitable foraging habitat for the bat due to the presence of paniculate agaves, primarily Palmer’s agave, across large areas of the EMA.

Effects of the Action

The severity of adverse effects to *Leptonycteris* bats resulting from the potential reduction in forage resources is dependent on the importance of forage plants in a specific area to reproduction, survival, and growth of the bat. The way in which livestock management activities may affect *Leptonycteris* bats has been discussed in detail earlier in this biological opinion in the “effects of the action” section under the lesser long-nosed bat. However, only the Peloncillo EMA is considered potential foraging habitat for the Mexican long-nosed bat. Areas with high densities of paniculate agaves in Arizona and New Mexico may be important to the Mexican long-nosed bat, especially in certain years when the bat may tend to wonder widely, perhaps due to reductions in forage opportunities near occupied roosts.

About 94 percent of the Peloncillo EMA is managed as capable. While grazing is permitted on 85 percent of the capable area some time during the agave bolting season, the actual area grazed is less than this because of grazing rotation and rest systems. Allowable use levels are greater than 45 percent (measured at key areas) on allotments comprising 97 percent of the capable area. Since not all areas receive uniform use, some areas will receive slightly higher than allowable use, others less. Of the total EMA, 11 percent is in low or moderately low range condition and 52 percent has impaired or unsatisfactory soil condition. There are several records of lesser long-nosed bats using this area; for the Mexican long-nosed bat there are only incidental occurrence records from areas next to the EMA. Collection records of Mexican long-nosed bats from the Animas Mountains suggest the potential for this species to be present in the Peloncillo EMA.

Several agave and bat research and monitoring projects are underway within the Peloncillo EMA. If these projects identify specific areas of concern for the Mexican long-nosed bat, detect significant numbers of bats using the area, or other new information, reinitiation of consultation may be appropriate. Based on available information regarding the distribution and ecology of the Mexican long-nosed bat, the proposed grazing actions within the Peloncillo EMA is not likely to affect Mexican long-nosed bat survivorship.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline. Much of the land in the project area of concern for the Mexican long-nosed bat is managed by the Forest, though there are substantial areas of private land in both Arizona and New Mexico.

On a landscape level, paniculate agave populations appear to be well dispersed. However, the percentage of the agave population which successfully produces flowering stalks is unknown. Throughout much of the range of the Mexican long-nosed bat in the United States, its forage plants are exposed to Federal, State, Tribal, and private livestock grazing management activities. The overall effects of grazing (herbivory, trampling, and ecosystem changes affecting plant reproduction, recruitment, and establishment) on bat forage plants is unknown. *Leptonycteris* bat foraging ecology and energy budget is largely unknown. This, combined with potential disturbance of roost sites and loss of habitat due to urbanization and other activities on large tracts of State and private lands within the range of the bat, contributes to negative impacts on Mexican long-nosed bats. The Peloncillo EMA, the only EMA where the Mexican long-nosed bat may potentially occur, is not known to have any roosts. Ongoing activities in the Peloncillo EMA are primarily livestock management associated with Federal, State, and private lands. The effects of all these actions are considered cumulative to proposed action.

Conclusion

After reviewing the current status of the Mexican long-nosed bat, the environmental baseline for the project area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the ongoing and long term grazing activities on the Coronado NF are not likely to jeopardize the continued existence of the Mexican long-nosed bat. No critical habitat has been designated for this species; therefore, none will be affected. Our conclusion that the proposed action is not likely to jeopardize the species is based on the following:

1. The Coronado National Forest included mitigation measures in the proposed action to avoid destruction of agaves and disturbance of *Leptonycteris* bat roosts during construction of range projects.

2. The project area is largely outside the range of the Mexican long-nosed bat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

No take of Mexican long-nosed bats is anticipated as a result of the proposed action.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the Mexican long-nosed bat. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The Forest should continue (expand) cooperative efforts to survey for *Leptonycteris* bat roosts, and protect and monitor these sites.

2. The Forest should continue support and cooperation in the investigations of agave relationships to livestock grazing, and of the effects of prescribed fire on paniculate agaves.

3. The Forest should implement the Mexican long-nosed bat recovery plan, as appropriate.

In order for the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

(Note: Surveys for Mexican long-nosed bats, or other bats, that involve capture or take require appropriate permits from the Service and Arizona Game and Fish Department.)

NEW MEXICO RIDGENOSE RATTLESNAKE (*Crotalus willardi obscurus*)

Status of the Species

The New Mexico ridgenose rattlesnake is a small [maximum of 66 cm (2.19 ft) total length] montane species known only from the Animas Mountains, Hidalgo County, New Mexico; Peloncillo Mountains, Hidalgo County, and Cochise County, Arizona; and the Sierra San Luis, Sonora and Chihuahua, Mexico (Campbell et al. 1989, Painter 1995, Degenhardt et al. 1996, Keegan et al. *in press*). The subspecies was first documented in Arizona on October 24, 1996. The subspecies may also occur in the Sierra Pulpita in Chihuahua (Barker 1991). The New Mexico ridgenose rattlesnake is one of five subspecies of the ridgenose rattlesnake found from montane areas of southeastern Arizona and southwestern New Mexico, south through the Sierra Madre to Zacatecas, Mexico. *C. w. obscurus* is closely related to *C. w. silus*, but the two can be distinguished based on a variety of scalation and coloration traits; the two are also distinct biochemically (Harris and Simmons 1976, Barker 1992).

The New Mexico ridgenose rattlesnake is an inhabitant of insular woodlands that were more widespread and continuous during Pleistocene glaciation events (Maldonado-Koerdell 1964, Barker 1992, Van Devender 1995) A Pleistocene fossil *Crotalus willardi* from the San Pedro River Valley (Mead 1975) suggests ridgenose rattlesnakes tracked the distribution of the woodlands. When climates warmed and became drier, the ranges of this and other montane woodland reptiles, such as *Elgaria kingii*, *Eumeces callicephalus*, *Phrynosoma douglasii,* presumably contracted with that of the woodland communities and are now isolated on mountain tops in the Madrean region. Isolation and subsequent evolution have contributed to subspecific differences within *Crotalus willardi* (Barker 1992).

C. w. obscurus has been found in steep, rocky canyons with intermittent streams or on talus slopes at elevations ranging from approximately 1,576 to 2,576 m (5,200-8,500 ft)(Campbell et al. 1989, Barker 1991, Painter 1995, Degenhardt et al. 1996, A. Holycross, Arizona State University, pers. comm., 1997), and likely occurs as low as 1,515 m (5,000 ft) in the Peloncillo Mountains (Holycross 1999). The subspecies is found primarily in areas of Madrean evergreen woodland and Petran montane conifer forest (Brown 1982, Pase and Brown 1982). Dominant vegetation characterizing the habitat of this subspecies includes several species of oak, *Quercus* spp.; Douglas fir, *Pseudotsuga menziesii*; Apache pine, *Pinus engelmannii*; Chihuahua pine, *P. leiophylla* var. *chihuahuana*; Arizona madrone, *Arbutus arizonica*; manzanita, *Arctostaphylos pungens*; and grasses (Degenhardt 1972, Barker 1991, Degenhardt et al. 1996, Holycross 1998). Access to rock shelters with moderate interstitial spaces is probably a key habitat component (Barker 1991); however, the subspecies also uses perennial bunch grasses for cover (Painter 1995). New Mexico ridgenose rattlesnakes apparently move less frequently, move relatively short distances, and show high fidelity to specific rock shelter sites as compared to other rattlesnake species (Barker 1991, Holycross 1995a and 1995b).

In the recovery plan for the species (USFWS 1985), 250-500 adult snakes were estimated to inhabit the Animas Mountains. However, based on eight years of mark and recapture data in

West Fork Canyon, Animas Mountains, Holycross (1999) suggests this is an underestimate. Encounter rates by experienced herpetologists suggest the densest populations may occur in the portions of the Sierra San Luis, with comparatively moderate and low densities in the Animas and Peloncillo mountains, respectively (Holycross 1998). However, densities probably vary greatly within mountain ranges, and encounter rates may not be indicative of population densities.

Young snakes are live born probably in late June through August (Holycross 1995b, Painter 1995). Mean litter size for 12 broods was 5.5 (Applegarth 1980). Fecal samples from 12 New Mexico ridgenose rattlesnakes captured in the Sierra San Luis contained rodent hairs, lizard scales, and parts of large centipedes, *Scolopendra* spp. (Barker 1991). Applegarth (1980) reported that the diet of *C. willardi* includes a variety of items, including rodents, birds, lizards, snakes, and arthropods. Barker (1991) suggests *C. w. obscurus* tends to feed on rodents whereas *C. lepidus* feeds primarily on lizards and centipedes.

The New Mexico ridgenose rattlesnake was listed as a threatened species by the Service in an August 4, 1978, Federal Register notice (43 FR 34479). Critical habitat was also designated in Bear, Spring, and Indian canyons of the Animas Mountains from 1,833 to 2,521 m (6,048-8,320 ft) elevation. At the time of listing the subspecies was not known to occur in the Peloncillo Mountains. The subspecies occurs in three (or more), small disjunct populations. As a result, its viability is sensitive to habitat destruction or modification, and collection. After publication of the Animas locality in 1961 (Bogert and Degenhardt 1961), the area was reportedly heavily collected. Harris and Simmons (1976) reported encountering 15 collectors from six states during August 1974 in the Animas Mountains. The USFWS (1985) estimated that as many as 130 New Mexico ridgenose rattlesnakes may have been collected in the Animas Mountains between 1961 and 1974. Collection during this period may have significantly affected the Animas population (Harris and Simmons 1976, USFWS 1985). The Animas Mountains are privately owned and access to habitat areas is now strictly controlled. However, most of the habitat of the ridgenose rattlesnake in the Peloncillo Mountains is managed by the Coronado National Forest and the Bureau of Land Management, and is open to public use; thus providing more of an opportunity for illegal collecting. Fire and overgrazing may adversely affect the habitat of this subspecies (USFWS 1985, Barker 1991), and mining, development, and logging are potential threats (USFWS 1985). Further information on the taxonomy, range, distribution, biology, and threats to the New Mexico ridgenose rattlesnake can be found in Painter (1995), Holycross (1995a & b, 1998), Holycross and Douglas (1997), Applegarth (1980), Barker (1991, 1992), Campbell et al. (1989), Degenhardt et al. (1996), and Degenhardt (1972).

Environmental Baseline

Within the project area, the New Mexico ridgenose rattlesnake occurs only at the higher elevations of the Peloncillo Mountains in extreme southeastern Cochise County and southwestern Hidalgo County. This range is relatively dry and low compared to the Chiricahua Mountains to the west and the Animas Mountains to the east. Hilly and mountainous terrain with several major drainages characterizes the area, including Deer Creek, Skeleton Canyon, Whitmire Canyon, Clanton Draw, Cloverdale Creek, and Sycamore and Estes canyons. The vegetation of the lower slopes is characterized by shrubs and grasses, with velvet mesquite, juniper *(Juniperus* spp.), whitethorn acacia *(Acacia constricta),* and various perennial grasses predominating. In the higher elevations, pinyon pine *(Pinus edulis*), Apache pine, Chihuahua pine, and oaks are more abundant. Riparian vegetation is found in Clanton Draw, Cloverdale Creek, and at several other sites, and includes Arizona ash, Arizona sycamore, cottonwood, mesquite, and netleaf hackberry *(Celtis laevigata)*.

The New Mexico ridgenose rattlesnake was first discovered in the Peloncillo Mountains in the form of an apparent hybrid *Crotalus willardi X lepidus* collected in 1987 (Campbell et al. 1989). A total of 25 ridgenose rattlesnakes and the one hybrid snake have been found in the Peloncillo Mountains in 12 general areas from upper Miller Canyon on the south to South Skeleton Canyon on the north (Holycross and Douglas 1997, A. Holycross, pers. comm., 1999). Three of the 25 localities are in Arizona, all from South Skeleton Canyon. The precise collection locality of the hybrid specimen is unknown. In the Peloncillo Mountains, the New Mexico ridgenose rattlesnake has been found from approximately 1,576 to 1,879 m (5,200-6,200 ft) elevation (Holycross, pers. comm., 1997). Holycross and Douglas (1997) considered areas above 1,525 m (5,000 ft) from Skull Canyon on the north to the Mexican boundary to be potential habitat for the species. However, recent analysis suggests that no suitable habitat exists north of Skeleton Canyon (Holycross, pers. comm., 1999). Holycross believes that at lower elevations the species probably occurs primarily in the bottoms of steep, heavily-wooded canyons. At higher elevations the species is found in woodlands, open woodlands, and chaparral on exposed slopes and plateaus. A map of woodland habitats of the ridgenose rattlesnake in the Peloncillo Mountains is in preparation by Andy Holycross and Brian Fedorko, but was unavailable at the time of this writing. We understand the map will delineate suitable woodland habitats, but that the snake may use other habitats as well.

Areas in which ridgenose rattlesnakes have been found in the Peloncillo Mountains are characteristically more arid, lower, and less vegetated than typical habitats in the Animas Mountains of New Mexico. The snakes are often found on talus slopes in the Animas Mountains, but talus is apparently absent from the Peloncillo Mountains. The species is also much more difficult to find in the Peloncillo Mountains. An average of 33 person-days is needed to find one ridgenose rattlesnake in the Peloncillo Mountains. In the Animas Mountains the encounter rate is about one snake per four person-days of search time (Holycross, pers. comm., 1998.)

A general listing of threats to the New Mexico ridgenose rattlesnake that contribute to its status as a threatened species is found in the section "Status of the Species" above. Activities that may affect the rattlesnake in the Peloncillo Mountains include prescribed fire, wildfire, poaching, cattle grazing, commercial beargrass (*Nolina microcarpa)* harvesting, and low to moderate levels of recreational activities such as birding, driving on or off roads, backpacking, camping, hunting, and nature study. The Peloncillo Mountains are much more accessible than the Animas or San Luis ranges, which makes illegal collection and other human activities potentially more important threats than elsewhere in the range of the snake. Also, the likely small size and possible disjunct nature of snake populations in the Peloncillo Mountains make these populations especially vulnerable to habitat degradation and collection.

A planning effort is underway in the Peloncillo Mountains to restore a natural fire regime to the area. A long history of cattle grazing coupled with a changing climate and possibly other factors have favored a decline in fire frequency and subsequent conversion of grasslands to shrublands in much of the Southwest (Weltzin and McPherson 1994, Bahre 1995, McPherson 1995, Van Devender 1995, Villanueva-Diaz and McPherson 1996, Curtin and Brown no date). Data are lacking to discern recent patterns of vegetation community change in the Peloncillo Mountains, but anecdotal accounts suggest some areas, such as Cottonwood Basin, once supported more open communities, and fire, which probably was a regular occurrence in the range is now a rare event. As a result, woody fuel loads have built up in the woodland habitats of the snake. These fuels, if ignited, could cause a crown fire and loss of woodland habitat. The 1997 Maverick prescribed fire burned 2,800 to 3,200 ha (7,000-8,000 ac) from approximately Sycamore Canyon on the south to just north of Geronimo Trail. Three ridgenose rattlesnakes were radio-telemetered and located before and after the fire. None were injured or killed in the fire; however, a radio-telemetered rock rattlesnake (*Crotalus lepidus*), was killed, an apparent victim of the fire, and a Sonoran whipsnake, *Masticophis bilineatus*, was found dead, a possible victim of the fire. Although no ridgenose rattlesnakes were known to be adversely affected, the fire destroyed woodland habitat of the snake in Whitmire Canyon and in 17 other woodland patches (Lawrence Smith, pers. comm., 1998, Holycross, pers. comm., 1999). Because the ridgenose rattlesnake is apparently a woodland species, hot fires that destroy woodlands are a serious threat to the ridgenose rattlesnake.

The USFS (1998c) identified 12 allotments where adverse effects to ridgenose rattlesnake may be occurring. These include all but one allotment in the Peloncillo EMA: Clanton/Cloverdale, Deer Creek, Fairchild, Geronimo, Graves, Guadalupe, Juniper Basin, Maverick, Outlaw Mountain, Robertson, and Skeleton Canyon. The one allotment in the Peloncillo EMA not covered in this opinion is Skull Canyon, which was addressed in a separate consultation between the Regional Office of the Forest Service and the Fish and Wildlife Service New Mexico Ecological Services Office. Following the effects determination criteria, adverse effects are anticipated if grazing occurs in the habitat of the snake [above 1,525 m (5,000 ft) in the Peloncillo Mountains]. All 12 allotments addressed in this consultation contain areas above 1,525 m (5,000 ft). Holycross and Douglas (1997) considered areas above 1,525 m (5,000 ft) from Skull Canyon on the north to the Mexican boundary to be potential habitat for the snake. Recent habitat analysis by Holycross (pers. comm., 1999) indicates that no suitable habitat occurs north of Skeleton Canyon, thus apparently no habitat nor New Mexico ridgenose rattlesnakes occur in the Deer Creek, Juniper Basin, or Skull Canyon allotments.

New Mexico ridgenose rattlesnakes have been found only in the Maverick, Geronimo, Walnut Canyon, and Fairchild allotments. However, most of the survey work has focused in these areas and much of the potentially suitable habitat has yet to be adequately surveyed for rattlesnakes. Overlaying the vegetation community type map (Figure LNB-3) and the allotment map (Figure I-3) from USFS (1998c) shows most of the woodland habitats are in the center of the mountain range, which corresponds to where snakes have been found. The largest acreages of woodland habitat occur in the four allotments where ridgenose rattlesnakes have been found. The Walnut Canyon allotment contains the largest acreage of woodland habitat. According to the maps, the Deer Creek, Outlaw Mountain, Guadalupe, Skeleton Canyon, and Robertson allotments contain smaller areas of woodland communities. The Clanton/Cloverdale, Juniper Basin, and Graves allotments contain little or no woodland communities.

The Service has issued three biological opinions on the New Mexico ridgenose rattlesnake. On May 3, 1997, the Service issued a biological opinion to the Coronado National Forest for the proposed Maverick prescribed fire. On September 26, 1997, a biological opinion was issued to the Bureau of Land Management on the Safford and Tucson Field Offices' grazing program. A biological opinion dated December 19, 1997, was issued to the Southwest Region of the Forest Service on the land and resource management plans for eleven national forests and grasslands. The Service determined in each case that the proposed action was not likely to jeopardize the continued existence of the rattlesnake or result in destruction or adverse modification of critical habitat.

Effects of the Action

The New Mexico ridgenose rattlesnake recovery plan (USFWS 1985) identifies "excessive grazing" as a potential threat to the continued survival of the subspecies. However, the effects of grazing on this or other species of rattlesnakes are largely speculative and poorly studied. Direct effects to snakes are possible due to cattle stepping on animals; however, no information is available to assess if or how frequently trampling occurs. Holycross (pers. comm., 1999) related an incident told by another herpetologist in which a rat snake (*Elaphe guttata)* and a milk snake *(Lampropeltis triangulum)* were killed when a cow stepped on the rock under which they had taken refuge. Given the large projected number of livestock on the 12 allotments (over 1,800) and the duration of the action (three years in all allotments except Walnut Canyon, in which duration is six years), similar incidents involving ridgenose rattlesnakes may occur. Trampling is probably most likely for a small snake. Six of the allotments containing suitable habitat are grazed year-long (Robertson, Outlaw Mountain, Cloverdale/Clanton, Walnut Canyon, Graves, and Guadalupe), while the other four are grazed for varying periods as early as October 1 but no later than April 30 (USFS 1998c). New Mexico ridgenose rattlesnakes have been found from April 18 to October 24 in the Peloncillo Mountains (Service files), and are probably active somewhat earlier and somewhat later than this period. During the winter months they are most likely dormant in rock shelters or other sites protected from trampling. Thus, trampling is most likely to occur where livestock remain year-long in rattlesnake habitat. In the allotments where New Mexico ridgenose rattlesnakes have been found, grazing occurs as follows: Fairchild (92 cow/calf 10/1-3/15), Walnut Canyon (271 cow/calf year-long), Geronimo (198 cow/calf 11/16-4/30), and Maverick (278 cow/calf 11/20-2/15, 7 horses year-long).

Rattlesnakes are frequently killed by the public. Snakes could be killed by permittees or ranch hands that may encounter snakes, or snakes could be run over by vehicles or trampled by riders on horse back that are associated with grazing activities. Roads created or maintained as part of the grazing program could provide access to the public and facilitate illegal collecting or killing of ridgenose rattlesnakes. For the term of this consultation, no road construction is proposed in any of the 10 allotments containing suitable habitat (USFS 1998c).

Direct effects are also possible as a result of construction or maintenance of range projects. Such projects are proposed for six of the allotments, and include stock tank construction or improvement, pipelines, waterlots, fences, gully control, and on the Clanton/Cloverdale allotment, control of mesquite on 200 ha (500 ac). Snakes could be killed or injured during construction or maintenance activities. Water developments above 1,515 m (5,000 ft) could draw cattle into rattlesnake habitat and increase the probability of trampling or habitat degradation. New water developments could also destroy and inundate ridgenose rattlesnake habitat. Mesquite is not abundant at the higher elevations where ridgenose rattlesnakes occur, thus the proposed mesquite control project on the Clanton/Cloverdale allotment would probably affect little or no ridgenose rattlesnake habitat.

Grazing in montane and valley grasslands and subsequent effects to bunch grass lizard (*Sceloporus slevini*) populations have been investigated on the Coronado National Forest in the Chiricahua Mountains (Ballinger and Congden 1996) and off-Forest near Elgin (Bock et al. 1990). In both cases, the lizard occurred only in low densities in grazed areas but was relatively abundant in areas that were ungrazed. Bock et al. (1990) suggest the lizard requires bunch grasses for protection from predation. The New Mexico ridgenose rattlesnake also uses large bunch grasses, such as *Muhlenbergia* and *Aristida*, for cover (C. Painter, New Mexico Game and Fish Department, pers. comm., 1996; Holycross, pers. comm., 1996). These grasses are very palatable to cattle. During work from 1995-7, Holycross and Douglas (1997) observed livestock grazing in portions of ridgenose rattlesnake habitat in the Peloncillo Mountains that removed all grass cover over approximately 4 cm (1.5 in) in height. Heavy grazing was also observed in Whitmire Canyon on the Walnut Canyon allotment and in wooded canyons on the Maverick allotment. Holycross (pers. comm. 1997) believes loss of ground cover may cause snakes to move less during key foraging or mating periods, and predation of snakes may increase because they are more visible. The snake's prey base could also be adversely affected by reducing seeds and vegetation available for rodents and herbivorous insects, of which the former is rattlesnake prey, and the latter supports lizard populations, which are also prey (Holycross and Douglas 1997). Reduced grass cover may also reduce fire frequency with associated effects to snake habitat discussed later herein. Holycross and Douglas (1997) recommend limiting grazing to the winter season in ridgenose rattlesnake habitat in the Peloncillo Mountains.

Range condition and trend, and soil condition for the 10 allotments containing suitable rattlesnake habitat are summarized in Table 16. The allotments are mostly in moderately high (good) range condition, with upward or static trends. Of the 10, three stand out as exceptions to these generalizations. Two allotments (Graves and Robertson) are mostly in moderately low (fair) condition with variable trends. Range condition on Outlaw Mountain is about half in high (excellent) condition, and half in moderately high (good) condition. Soil condition is variable, with some allotments, such as Skeleton Canyon and Outlaw Mountain, having the majority of soils in unsatisfactory condition. Other allotments (i.e., Fairchild, Graves, Maverick, and

Robertson) exhibit soils primarily in satisfactory condition. One allotment (Walnut Canyon) has 30 percent of its soils in an impaired condition.

Current grazing practices may cause degraded vegetation and soil conditions, or may be an artifact of past grazing practices. Range vegetation and soil conditions may also be affected by fire and subsequent erosion; changes in fire regimes; roads, off-road vehicles, urban, and other surface-disturbing activities; grazing by wildlife species; drought; floods; changes in climatic regimes; introduced nonnative plants, such as Lehmann lovegrass (*Eragrostis lehmanniana*); or combinations of factors (Humphrey 1958, Hastings and Turner 1965, Martin 1975, Brown and McDonald 1995, Wang et al. 1997). Cattle grazing is the primary human use in the range of the rattlesnake and no doubt has affected vegetation communities and soil condition. However, the Maverick fire and other recent fires (Sycamore and Baker canyon fires) have also played important roles in current conditions.

Authorized maximum utilization rates in the allotments range from 45 to 55 percent. In semi-desert grasslands, Holechek et al. (1998) recommended that utilization average about 35 percent. For semi-desert grass/shrub rangelands, Martin (1975) recommended that average utilization rates should be about 40 percent, but may range as high as 60 percent in dry years to as low as 20 percent in high production years. To affect an improvement in degraded range condition, lower utilization rates should be applied (Martin 1973, Holechek et al. 1998). The maximum utilization rates authorized by the Coronado in key areas may not reflect average utilization over space and time within the allotments. However, because they are higher than the averages recommended by Holechek and Martin, the potential exists under permitted grazing to average more than 40 percent utilization, which may be more than the rangeland can sustain without degradation. The observations of Holycross and Douglas (1997), discussed above, suggest that overgrazing may be adversely affecting rattlesnake habitat in the Peloncillo Mountains. Areas they observed where grass was cropped to 4 cm (1.5 in) were probably grazed well in excess of the authorized 55 percent maximum. In late April 1997, Service personnel observed heavy grazing near the crest of the mountains in the Maverick allotment that well exceeded 55 percent utilization (J. Rorabaugh, Service, pers. obs., 1997).

Although authorized utilization rates may allow for utilization in excess of the recommended 35 to 40 percent, and anecdotal observations suggest some overgrazing occurs, the allotments are mostly in an upward or static condition (Table 16). Range condition trend may indicate the effect of current or recent management, which in this case indicates management is not currently

Table 16. Range condition and trend and soil condition in the 10 allotments containing suitable habitat for the New Mexico ridgenose rattlesnake on the Coronado National Forest.

Allotment	Range Condition and Trend[1]				Soil Condition[2]			
	High	Mod High	Mod Low	Low	Satisfactory	Unsatis-factory	Impaired	Unsuited

Walnut Canyon	0	10(U) 85(S)	5(S)	0	50	20	30	0
Clanton/ Cloverdale	0	65(U) 35(S)	0	0	45	55	0	0
Fairchild	0	70(U) 30(S)	0	0	85	15	0	0
Geronimo	0	70(U) 30(S)	0	0	45	55	0	0
Graves	0	40(U)	60(S)	0	75	25	0	0
Guadalupe	0	70(U) 20(S)	10(U)	0	60	40	0	0
Maverick	0	100 (U)	0	0	70	30	0	0
Outlaw Mountain[3]	25(U) 35(S)	5(U) 40(S)	0	0	40	55	5	0
Robertson	0	5(U)4 0(S)	20(U) 35(D)	0	82	7	0	11
Skeleton Canyon	0	100 (U)	0	0	15	75	0	10

[1] Percentages of allotments in the 4 range condition classes. Trend is shown in parentheses as follows: U=upward, S=static, D=downward .
[2] Percentages of the allotments in the 4 soil condition classes.
[3] Total of 105% taken from USFS (1998c).

causing degradation of range condition. Whether this continues to be the case will be borne out by future monitoring.

The relationship between rattlesnake habitat quality and range condition or soil condition is unclear. However, as discussed above, altered plant communities could affect cover for the snake and prey species abundance through changes in cover and forage resources. Perhaps of greatest concern are the large percentages of soils in unsatisfactory condition on many allotments. Soils in this condition class may not support natural plant communities and erosion and sedimentation in degraded soils could cause burial of rock outcrops and other cover sites of the ridgenose rattlesnake. The definition of “unsatisfactory” includes the statement that “soils rated in the unsatisfactory category are a high priority for land managers to evaluate and change management practices.” The degree to which unsatisfactory soil condition has been the result of grazing versus recent fires or other activities is unknown. However, grazing is probably the primary management activity on the landscape that may affect recovery of these degraded soils.

Of particular concern for the New Mexico ridgenose rattlesnake is the effect of livestock grazing on fire frequency and intensity. Before about 1900, widespread surface fires occurred in the Madrean borderlands. These frequent, low-intensity ground fires ceased to occur about the time intensive livestock grazing began (Swetnam and Baisan 1996). Although other factors likely played some role in the elimination of frequent ground fires, most authors agree that livestock grazing was probably the most important, at least before effective fire suppression began in the 1930's (Bahre 1991, 1995, Swetnam and Baisan 1996, Danzer et al. 1997). Livestock grazing removes herbaceous fine fuels that normally carry fire. Without fire, ladder fuels and woody material build up in woodlands. The result is that when fires finally do occur, they can be catastrophic and stand-replacing (Danzer et al. 1997). Fire suppression efforts have been few in the Peloncillo Mountains (E. Encinas, Coronado National Forest, pers. comm., 1997); thus livestock grazing may be the most important factor in apparent altered fire regimes in this mountain range.

The effects of livestock grazing on fire spread in the Peloncillo Mountains could be seen after the Maverick prescribed fire. The fire burned through Cottonwood Basin on the Geronimo allotment but stopped at the boundary of the Maverick allotment, because grazing had removed enough of the grasses and other fine fuels to halt the fire. Woodlands in the Peloncillo Mountains are apparently susceptible to high intensity fire. Chihuahua pine woodland in Whitmire Canyon was consumed in a very hot crown fire when the Maverick Fire jumped Geronimo Trail and escaped control. Experts on the snake (Painter, pers. comm., 1998, Holycross, pers. comm., 1998) believe Whitmire Canyon is no longer suitable habitat for the ridgenose rattlesnake. During the habitat inventory in 1998-1999, 18 woodland patches (11 percent of all woodland patches identified) were found to have been destroyed in the Maverick fire (Holycross, pers. comm., 1999).

A wildfire burned through a New Mexico ridgenose rattlesnake study site in the Sierra San Luis, Chihuahua, in June and July 1991. Barker (1991) reported that the fire was extremely hot and intense, possibly of a similar intensity to the escaped Maverick Prescribed Fire in Whitmire Canyon. Almost all vegetation was consumed, rock piles were broken apart or covered with silt deposited from eroding hillsides, and boulders were split open from the intense heat. The encounter rate of ridgenose rattlesnakes decreased after the fire, a routinely monitored snake equipped with a transmitter vanished after the fire, and one of six individuals captured after the fire exhibited burns on its dorsum. However, at least two telemetered ridgenose rattlesnakes survived the fire, including one in an area that apparently burned especially hot. Barker (1991) suggested snakes that survived the fire may have been more subject to predation as a result of reduced cover. In a burned area he observed a zone-tailed hawk *(Buteo albonotatus*) flying with a small snake in its talons that may have been a ridgenose rattlesnake. The prey base of the rattlesnake would also likely be affected by fire. Small mammal densities and diversities are typically depressed for 1 to 3 years after a fire (Wright and Bailey 1982).

As previously discussed, although three telemetered ridgenose rattlesnakes survived the Maverick fire, a rock rattlesnake was an apparent victim, and the fire may have killed a Sonoran whipsnake. Evidence from other areas suggests snakes can be killed or injured in fires. Jeff Howland (Service, Phoenix, pers. comm., 1996) reported finding a dead western diamondback rattlesnake (*Crotalus atrox*) apparently killed by a wildfire in the McDowell Mountains near Phoenix. Todd Esque (USGS Biological Resource Division, St. George, Utah, pers. comm., 1996) found a gopher snake (*Pituophis melanoleucus*) and a tiger rattlesnake (*Crotalus tigris*) apparently killed by wildfire in the Pusch Ridge fire (Santa Catalina Mountains, Arizona) and the Rock Peak fire, San Tan Mountains, Arizona, respectively.

In the short term, livestock grazing can protect the woodland habitats of the rattlesnake from fire by removing fine fuels. However, by doing so, grazing promotes infrequent crown fires that destroy woodland habitats of the rattlesnake. A long history of grazing and the absence of fire from the Peloncillo Mountains has resulted in a situation where if fire does occur during warm seasons when fuels are dry, many woodland patches are likely to burn hot and rattlesnake habitat is likely to be lost. Current fire planning by the Coronado National Forest, Natural Resource Conservation Service, Bureau of Land Management, the Malpai Borderlands Group, and others is targeting mid- to high-elevation areas of the Peloncillo Mountains, including habitats of the ridgenose rattlesnake. To change fire regimes back to a more natural pattern of frequent ground fires without destroying woodland habitats will require careful application of cool season or low-intensity fire in woodlands in a way that consumes ladder fuels and understory vegetation without creating a crown fire. However, any attempt to reestablish a natural fire regime in the Peloncillo Mountains will depend upon properly managed livestock grazing so that sufficient fine fuels remain on the landscape to carry a fire.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (state, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal, and private actions are considered in the "Environmental Baseline".

The majority of potential habitat for the ridgenose rattlesnake in the Peloncillo Mountains is administered by the Forest. Smaller areas are privately owned or administered by the Bureau of Land Management. Thus, most activities anticipated in the project area would be Federal actions subject to consultation and are not considered cumulative. Livestock grazing and other ranching activities occur on the limited private lands in the Peloncillo Mountains above 2,525 m (5,000 ft). These activities may result in localized habitat degradation.

Conclusion

After reviewing the current status of the New Mexico ridgenose rattlesnake, the environmental baseline for the action area, and the anticipated effects of the proposed Coronado National Forest grazing program, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the New Mexico ridgenose rattlesnake. No critical habitat has been designated for this species in the Peloncillo Mountains, thus none will be affected. We present our conclusion regarding jeopardy/no jeopardy for the following reasons:

1. Four of 10 allotments containing New Mexico ridgenose rattlesnake habitat are not grazed by livestock during all or much of the season when the snakes are active. Only 1 of the 4 allotments where snakes have been found is grazed year-long.

2. Although a significant percentage of soils and some rangelands in the allotments containing rattlesnake habitat are in degraded condition, range condition is largely good and the trend is often upward, suggesting current management is affecting an improvement.

3. The Forest and others are developing a programmatic fire plan for the Peloncillo Mountains that should address the threat of catastrophic, stand-replacing fire in rattlesnake habitat; a threat caused or is due in part to livestock grazing.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of a listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Coronado has a continuing duty to regulate the activity covered by this incidental take statement. If the Coronado (1) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service anticipates the following forms of take as a result of the proposed action:

1) Two New Mexico ridgenose rattlesnakes as a result of direct impacts, including trampling by cattle or horses associated with grazing, snakes run over by vehicles associated with livestock grazing, snakes killed by permittees or ranch hands, and construction and maintenance of range projects.

2) Two New Mexico ridgenose rattlesnakes as a result of indirect effects of livestock grazing, including reduction of cover quantity or quality and grazing that facilitates infrequent hot crown fires rather than frequent cooler ground fires.

This biological opinion does not authorize any form of take not incidental to implementation of the Coronado National Forest grazing program. If the incidental take authorized by this opinion is exceeded, the Forest must immediately reinitiate consultation with the Service to avoid a violation of section 9 of the Act. In the interim, the Forest must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species. The Forest should provide to this office an explanation of the cause of the taking. Note that although intentional killing and poaching of snakes could occur as a result of the proposed action, such take **is not** authorized by this incidental take statement.

EFFECT OF THE TAKE

In this biological opinion, the Service finds the anticipated level of take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of New Mexico ridgenose rattlesnake:

1. The Forest shall coordinate with the Service to ensure that project-level activities are designed to minimize take of New Mexico ridgenose rattlesnake.

2. The Forest shall include measures in project-level activities to reduce take of New Mexico ridgenose rattlesnake to the extent possible.

3. The Forest shall continue development and implementation of a programmatic fire plan for the Peloncillo Mountains that will reduce the risk of catastrophic, stand-replacing fire in New Mexico ridgenose rattlesnake habitat. (Note: the purpose of this reasonable and prudent measure is to reduce take of ridgenose rattlesnakes associated with proposed livestock grazing activities. The effects of livestock grazing activities include increased risk of stand-replacing fire.)

4. The Forest shall investigate the causes of degraded soil conditions and develop strategies to ensure unsatisfactory soil conditions begin to improve.

5. The Forest shall monitor grazing activities and incidental take resulting from the proposed action and report to the Service the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with the following terms and conditions in regard to the proposed action. These terms and conditions implement the reasonable and prudent measures described above. Terms and conditions are nondiscretionary. These measures shall apply to areas above 1,525 m (5,000 ft) in all 10 allotments listed in Table 16, unless otherwise noted.

1. The following term and condition implements reasonable and prudent measure number 1:

The Forest shall develop a mitigation plan in coordination with the Service for each range project or maintenance of roads other than Geronimo Trail above 1,525 m (5,000 ft.) The purpose of the mitigation plans will be to minimize potential take of New Mexico ridgenose rattlesnakes. The Service shall approve mitigation plans.

2. The following terms and conditions implement reasonable and prudent measure number 2:

a. The Forest shall ensure permittees and all field personnel who implement any portion of the proposed action shall be informed before the next grazing season of regulations and protective measures as described herein for the New Mexico ridgenose rattlesnake. All field personnel shall be informed that intentional killing, disturbance, or harassment of threatened or endangered species is a violation of the Act and could result in prosecution. All personnel shall be advised that care should be exercised when operating vehicles in the project area to avoid killing or injuring snakes on roads.

b. The Forest shall ensure that stocking rates, season of use, and utilization limits do not exceed those proposed in USFS (1998c).

3. The following terms and conditions implement reasonable and prudent measure number 3:

a. The Forest shall continue development of the Peloncillo Programmatic Fire Plan. One objective of the plan shall be application of cool season fire or other treatments in remaining woodland rattlesnake habitats that will condition these areas so that wildfire or warm season prescribed fire does not result in crown fires and destruction of New Mexico ridgenose rattlesnake habitat. Woodland habitats in the Walnut Canyon, Fairchild, Geronimo, and Maverick allotments should be first priority for treatment.

b. The Peloncillo Programmatic Fire Plan shall include grazing prescriptions that, following treatment of woodlands as described in 3.a, will allow for adequate build up of fine fuels to carry ground fires through woodland habitats of the rattlesnake at a frequency and intensity that reduces ground and ladder fuels, thereby reducing the chance of stand-replacing crown fires.

4. The following term and condition implements reasonable and prudent measure number 4:

The Forest shall determine or validate soil conditions and determine causes of any unsatisfactory or impaired soil conditions on the Walnut Canyon allotment by July 31, 2000. If current livestock management is inhibiting recovery of these soils, the Forest shall work with the permittee to modify management as needed to improve soil condition. Any needed changes in management shall be determined by June 2001, and implemented as soon as possible thereafter. For the Fairchild, Geronimo, and Maverick allotments, the Forest shall further investigate soil condition and determine causes of any unsatisfactory or impaired soil conditions. If current livestock management is inhibiting recovery of these soils, the Forest shall work with the permittees to modify management as needed to improve soil condition as part of the NEPA process on these allotments, to be completed in 2000 and 2001.

5. The following terms and conditions implement reasonable and prudent measure number 5:

a. Inventory, monitoring, and evaluations shall be conducted as described by Forest Service regulations governing management of grazing allotments.

b. In the annual monitoring report described in the general terms and conditions in this biological opinion, the Forest shall briefly summarize for the previous calendar year: 1) the effectiveness of these terms and conditions, and 2) documentation of take, if any. If such activities or monitoring occurs, the report shall also include summaries of: 1) grazing actions initiated or completed, such as range projects, planning for prescribed fires, development of allotment management plans, and vegetation management; 2) allotment inventory, evaluation, and monitoring results; and 3) any records of New Mexico ridgenose rattlesnake or evaluations of snake habitat.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the New Mexico ridgenose rattlesnake. In furtherance of the purposes of the Act, we recommend the following discretionary actions:

1. The Forest, in coordination with Arizona Game and Fish Department, New Mexico Game and Fish Department, Bureau of Land Management, the Service, and Malpai Borderlands Group, could inventory potential New Mexico ridgenose rattlesnake habitat in the Peloncillo Mountains, focusing on areas of potential habitat that have yet to be adequately surveyed.

2. The Forest, in coordination with Arizona Game and Fish Department, New Mexico Game and Fish Department, Bureau of Land Management, the Service, and Malpai Borderlands Group, could fund research designed to clarify life history and ecology of the species, that would quantify the effects of Forest Service-authorized activities, particularly livestock grazing and recreation, on the status of the snake.

3. The Forest could coordinate with the Bureau of Land Management, Natural Resource Conservation Service, the Service, the Malpai Borderlands Group, and others on development of an Ecosystem Management Plan for the Peloncillo Mountains and surrounding areas.

4. The Forest could adopt average utilization rates of 35 to 40 percent to maintain or improve range condition and vegetation communities in the long-term. Areas of allotments with unsatisfactory soil conditions, moderately low or low range condition, and areas with downward trends in range condition should be especially targeted for reduced utilization rates.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

(Note: surveys or other activities that involve capture or other forms of take of New Mexico ridgenose rattlesnake require appropriate permits from the Service and the applicable state Game and Fish Department.)

AMERICAN PEREGRINE FALCON (*Falco peregrinus anatum*)

Status of the Species

A medium-sized raptor, the peregrine falcon, with its various subspecies, is distributed world-wide. The American peregrine falcon is slate blue-gray on the back and wings and white on the underside. Its black head shows a vertical "bandit mask" pattern over the eyes. The wings are long and pointed, allowing the bird to reach flight speeds of up to 320 kph (200 mph) while diving in pursuit of prey (Cade 1982). The peregrine occurs across much of North America. In the American southwest, the peregrine is found almost anywhere large (greater than 100 meters) cliffs are available, except for the hottest and driest desert regions (Tibbitts and Ward 1990a, Ward 1993). Large cliffs overlooking chaparral, pinyon/juniper woodland, conifer forest, and riparian vegetation provide high-quality nesting/roosting and foraging habitat for this species. These areas typically occur between 1,072 to 2,745 m (3,500-9,000 ft) in elevation. Almost anywhere they exist in the southwest, suitable cliffs are occupied by breeding peregrines, even where surface water may be very distant (Ward 1993). Breeding peregrines seem year-round residents. This species also occurs throughout Arizona and New Mexico as migrants, transients, and wintering individuals.

Peregrines feed almost exclusively upon other birds such as shorebirds, pigeons, doves, robins, flickers, jays, swifts, swallows, and other passerine birds that opportunity presents (Craig 1986). They are generalist feeders and do not depend entirely upon one small group of birds for food. One of the most-frequently taken bird species in Arizona is the white-throated swift (Ellis et al. 1989), another cliff-dwelling bird. Peregrines have been observed capturing and eating bats over the Grand Canyon while in flight. Bats (Arizona hosts 28 species) are considered a significant food source for peregrines, but it is difficult to detect their importance in the bird's diet by conventional means (Glinski 1998).

Riparian vegetation, rivers, and other surface water may be a key feature in determining the presence of an adequate prey base for peregrines because these habitat areas attract bird species in greater numbers and diversity than drier, less complex sites. Large, open expanses of either land or water near steep rock faces and cliffs [greater than 33 m (100 ft)], appears to be a selected preference for peregrines when selecting a nesting site; it is thought this "openness" gives no escape cover for peregrine prey (Glinski 1998). Peregrines are found at elevations ranging from 132 m (400 ft)(lower Colorado River) to 8,181 m (9,000 ft) across the Mogollon Rim (between the White Mountains and the Kaibab Plateau). Tall buildings in Arizona's largest cities (Tucson and Phoenix) have been known to host peregrine nests; a persistent nest is occupied annually in the heart of Phoenix (Ron Fowler, pers. comm., 1998).

Peregrines capture and kill prey in several ways, with the most common being the stoop; a vertical dive from above. The peregrine grabs or knocks its prey out of the air with its opened feet. Peregrines have been observed to hunt cooperatively and pair up to pursue prey; one peregrine distracting the prey by flying by and the second peregrine grabbing or knocking the prey bird unconscious.

While some individual peregrines become adept hunters, it is estimated peregrines successfully acquire prey in only 10 to 40 percent of their attempts (Cade 1982, Roalkvem 1985). The peregrine compensates for this inefficiency by traveling extensively when hunting. During the breeding season, a hunting range of 16 km (10 mi) may be considered typical (Craig 1986). Because of this, the Peregrine Falcon Recovery Plan for the Southwest Population (USFWS 1984a) recommends against land use practices that adversely alter or eliminate the character of hunting habitat or the prey base within 16 km (10 mi) of an eyrie.

Peregrine breeding season in the American southwest extends annually from March 1 to late June or early July (Ward and Siemens 1995). Following territory establishment, courtship, and mating, nesting begins between mid-March through mid-May. Three to sometimes five eggs are subsequently laid in shallow "scrapes" on a cliff ledge. Both parents incubate the eggs (although the female is on the nest most of the time) for about 32 days, and both parents care for the young. Nestlings move about the nest at around four weeks and fledge at six weeks. Fledging occurs from late May through early August, with most fledgling falcons leaving the general area by the end of July (Glinski 1998).

The Service considers the peregrine falcon breeding season to extend to July 15 on the Coronado National Forest, in the Basin and Range physiographic province (Walker and Bufkin 1979, cited in Wards and Siemens 1995). The post-fledging period on the Coronado begins about July 15 for several elevational levels. For the Coronado National Forest, the Service believes in the absence of site-specific reproductive data for a given eyrie, no disturbing activity should occur within 800 m (0.5 mile [1.6 km] (one mile for blasting operations) of known or potential eyries or nesting habitat between March 1 and July 15, annually.

Peregrine historic breeding range is from Canada and Alaska south into Baja California, the central Mexican highlands, and northwest Mexico. It also includes the continental United States (except in the southeast corner of the country) (USFWS 1970). Currently, most breeding populations are confined to the mountainous areas of the western United States and Canada. The majority of peregrines winter in Mexico, and Central and South America. Some peregrines are known to remain in the American southwest year-round, and some peregrines in the northern United States are known to overwinter in the southwest.

Based on 1994 surveys, the current Rocky Mountain/Southwest population consists of 559 breeding pairs, surpassing the recovery objective by 376 pairs (FR 60:34406-34409). Recovery of the American peregrine falcon in the Rocky Mountain/Southwest Recovery Region of the United States appears greatest in the Colorado Plateau of southern Utah, southwest Colorado, northern Arizona, and in adjacent habitats in Arizona, Utah and Colorado. This region has experienced high total numbers of breeding pairs, high rates of site occupancy, and high reproductive success (Burnham and Enderson 1987, Tibbitts and Bibles 1990, Tibbitts and Ward 1990a, and 1990b; Enderson et al. 1991, Ward 1993).

The American peregrine falcon was listed as an endangered species in 1970 (USFWS 1970). Critical habitat has not been designated for this species. The recovery plan for the southwestern population of peregrine falcons was completed in 1984 (USFWS 1984a). The American peregrine falcon appears to be making considerable progress toward recovery throughout much of its range. On August 26, 1998, the Service published a proposed rule to remove the peregrine falcon in North America from the list of threatened and endangered species. The proposal to delist the species is based on available data indicating the species has recovered following restrictions on organochlorine pesticides in the United States and Canada and following implementation of successful management activities (USFWS 1998c). Throughout the United States and Canada, an estimated 1,562 pairs nested in 1997, which exceeded recovery goals by 931 pairs (USFWS 1998c). Recovery in the Rocky Mountain/Southwest region has been especially successful. All protections afforded endangered species would remain in place for the peregrine falcon until such time a final rule is published delisting the species in North America.

The primary reason for the peregrine population decline was noted as reproductive failure due to the uptake of organochlorine pesticides (e.g., DDT) into eggshells through the consumption of contaminated prey species (Hickey 1968, Ratcliffe 1980). Direct mortality of adult peregrines is now believed due to another pesticide, dieldrin (Glinski 1998).

Approximately 26 million kilograms (58 million lbs) of DDT were used throughout central and western Arizona until it was banned in 1969 (Ware 1974). After DDT use in the United States was banned, DDT and associated pesticides are still sold and used in Mexico and many Central and South American countries where they continue to affect peregrines.

Activities that may currently limit maximum productivity include human-induced disturbance of nests (deliberate or accidental), shooting of peregrines and the birds they prey on, collection of eggs and nestlings for falconry practices, and land management practices that reduce the available prey base by altering prey habitat and vegetative structure and composition (e.g., overgrazing) (USFWS 1984a).

Environmental Baseline in the Action Area

Due to the scarcity of historical records, historic status and distribution of the peregrine falcon in the action area is largely unknown. Currently, at least one known eyrie exists 3,400 m (2.1 mi) north of the Agua Caliente allotment. Located in the highest reaches of Elephant Butte, this site is on the Proctor allotment. There may be other unknown nest sites in and around Elephant Butte and the Santa Rita Mountains.

Loss or changes in nesting and foraging habitat impacts peregrines. During courtship, nest site selection, and mating, peregrines are most sensitive to disturbance. After they lay eggs and nestlings hatch, site fidelity becomes stronger and the parents defend the young and the nest area vigorously. Disturbance from human activities (rock climbing, gunfire, loud noises) near nest sites, particulary from above, can cause nest abandonment during the early breeding stages(Porter et al. 1973, Postovit and Postovit 1987, Deborah Beiber, pers. comm., 1998).

Peregrines can range up to 16 km (10 mi) or more in search of prey (Craig 1986). If the prey base is inadequate near their nest site, they must fly farther for food, expending more energy. Peregrines are generalist feeders, and many small birds and bats are available in the nearby and larger surrounding areas. Individual peregrines may tolerate more or less human-caused intrusions and disturbances (urban development, agricultural practices, livestock). These activities bring their own set of factors that impact the peregrine (prey species habitat alteration or loss, pesticides, monoculture crops, increased noise and disturbances).

The arid southwest supports the largest concentration of peregrine falcons known in North America, excluding Alaska (Burnham and Enderson 1987, Hays and Tibbitts 1989, Tibbitts and Bibles 1990, Brown 1991). In Arizona, more than 200 breeding pairs are distributed statewide in suitable habitat, except the low elevation deserts of the southwestern quarter of the State. In New Mexico, peregrine falcon populations are more sparse and patchy in distribution. More than 50 breeding pair occur on National Forest system lands in Arizona and approximately 25 pair occur in New Mexico. The remarkable recovery of the species has prompted the Service to propose the delisting of the peregrine falcon (USFWS 1998c).

The following information is taken from the Biological Assessment of On-going and long term grazing on the Coronado National Forest, dated November, 1998 (USFS 1998c). Grazing guidance criteria used for effects determination for this allotment for this species is taken from the Region Three Guidance Criteria for Determining the Effects of Issuing Term Grazing Permits on Threatened, Endangered or Species Proposed for Listing, dated August 25, 1998 (USFS 1998b).

The Coronado National Forest manages 200 grazing allotments scattered among 12 designated Ecosystem Management Areas (EMA's). The BA notes effects determinations for three allotments of "may affect, is likely to adversely affect". The three allotments are Agua Caliente (Santa Rita EMA) and Murphy and Ramanote allotments (Tumacacori EMA).

The Agua Caliente allotment shares a northern boundary fence with the Proctor allotment. One known peregrine eyrie occurs on the Proctor allotment (USFS 1998c:III-15) near Elephant Butte. The eyrie is 3.4 km (2.1 mi) north of the border fence between the two allotments. Range condition is primarily moderately high; condition trend is static. Forty-five percent of the allotments exhibits soils in unsatisfactory or impaired condition. Soil conditions and range condition trend suggests livestock grazing is impeding improvement of the system.

The Murphy allotment shares a southern border fence with the Ramanote allotment, both located on the east side of the Tumacacori EMA (USFS 1998c:III-16). Three peregrine eyries are known to occur in this EMA: One from the Atascosa Peak area in the Ramanote allotment, one in Sycamore Canyon (currently not an allotment), and one in the Fresnal allotment on Cerro del Fresnal. Another allotment, Pena Blanca, is within 3.4 km (2.1 mi) of the Atascosa Peak and Sycamore Canyon eyrie.

Range condition in the Pena Blanca allotment is moderately high with a static trend. Range condition in the Murphy and Ramanote allotments are split between moderately high and moderately low, and trends are static. In the Pena Blanca allotment, (considered here because it contains the known eyrie), range condition and trend indicates livestock grazing is not impeding improvements in range conditions (soils, watershed, riparian).

In the Murphy and Ramanote allotments, range conditions in a moderately low category (44 percent for Murphy and 38 percent for Ramanote) indicate livestock are impeding range condition improvement.

Effects of the action

Grazing affects avian abundance and species composition (e.g., songbirds) in various vegetation types, depending on grazing intensity, livestock impacts to physical land characteristics, and the degree to which the vegetative community is altered. Grazing is known to improve conditions for some bird species and decrease habitat quality for others (Bock et al. 1993). Peregrine falcons are prey generalists; they are not entirely dependent upon one small group of bird species as prey. Peregrine falcons forage over a large area [e.g., 16 km (10 mi)] (Enderson et al. 1991), and songbirds (primary prey) occur on a landscape basis, dependent upon the plant communities present. Simplification of habitat characteristics may not attract some bird species that otherwise would not be found on the allotment, although it could provide sufficient habitat for generalist species that might occur within adjacent vegetation types (e.g., mourning dove).

Livestock grazing may negatively impact peregrine falcons if the existing mosaic of vegetation attributes (e.g., plant structure and species composition) are simplified across the landscape. This could reduce bird species diversity and relative abundance in the area, thus reducing the prey base. Peregrine falcons forage in riparian and upland areas, although due to the greater diversity and abundance of potential prey, riparian areas may be used disproportionately more than their availability (Carothers 1974). Areas unprotected from livestock and heavy grazing may occur in the absence of enforced utilization standards. Range condition analyses for the Agua Caliente, Murphy, and Ramanote allotments suggest livestock grazing is adversely affecting vegetation communities in portions of the allotments.

Desert grassland, broadleaf woodland and coniferous forest, along with riparian areas, are found on the allotments. Historically, heavily-grazed areas provide fewer food and cover sources for most species of birds than lighter- or ungrazed areas, although some prey bird species are relatively unaffected by this condition (e.g., mourning dove). Unsatisfactory watershed conditions alter surface runoff, resulting in subsequent changes to tributary and stream hydrologic patterns and a loss of riparian vegetation diversity (e.g., structural and species). Alteration and implementation of grazing utilization standards and guidelines could be expected to improve the vegetation communities and foraging habitat for the peregrine falcon prey base.

Peregrine falcons may be disturbed by a variety of human actions occurring adjacent to an eyrie, and the most sensitive time for the bird is courting, mating, breeding season. Proposed activities (grazing, range projects) may adversely affect peregrine falcons. Grazing activities threaten peregrine falcon by location of facilities or disturbances too near the nesting site during the breeding season (recognized by the Service as beginning March 1 to July 15, annually). Grazing (and other) disturbances occurring above nesting sites (pastures on plateaus) are especially disturbing to the species during this time. Livestock-associated activities include range construction (stock tanks, fences), facility maintenance, gathering and trailing livestock, and other operations associated with routine livestock management. While potential for disturbances above known eyries on the consulted allotments is low, potential for breeding season disturbance near and below eyries still exists. To avoid disturbance of nesting peregrine falcons, the Service encourages agencies to refrain from conducting certain activities within 0.8 km (0.5 mile) of active nest sites from March 1 through July 15, annually. These activities include any surface-disturbing actions and activities that would produce loud noises (i.e., blasting and operation of chainsaws and heavy machinery).

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed action. Effects of past Federal and private actions are considered in the Environmental Baseline.

Most known occupied American peregrine falcon habitat in the project area occurs on National Forest System Land. Some known peregrine falcon locations occur on private, State, Tribal or other Federal lands. Urban development is increasing in Arizona and State and Tribal lands next to EMA's support ranching and agriculture. Agricultural activities (pesticide and herbicide spraying, monocultural cropping, loss of prey species habitat) pose an additional threat to the species. Concentrations of certain prey species which select these conditions (e.g., mourning doves) could provide an increased prey base, if peregrine falcons choose to forage in these settings.

Conclusion

After reviewing the current status of the American peregrine falcon, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the ongoing grazing activity on the Agua Caliente, Murphy, and Ramanote allotments is not likely to jeopardize the continued existence of the American peregrine falcon. Critical habitat has not been designated for this species in Arizona, thus critical habitat will not be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Forest Service so they become binding conditions of any grant or permit issued to the permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the (agency or applicant) must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Based on the proposed action and analysis of the effects provided above, the Service anticipates the following incidental take may occur because of the proposed action:

> Incidental take will be difficult to detect for the following reasons: The species is wideranging, finding a dead or impaired specimen is unlikely, losses may be masked by seasonal fluctuations in numbers or other causes (migration). However, the Service anticipates the proposed action will result in incidental take of two adults (or one pair) and associated eggs or young of American peregrine falcon. Take is anticipated from harassment and indirect mortalities due to construction of range improvement projects.

This biological opinion does not authorize any form of take not incidental to implementation of the Coronado National Forest grazing program. If the incidental take authorized by this opinion is exceeded, the Forest must immediately reinitiate consultation with the Service to avoid a violation of section 9 of the Act. In the interim, the Forest must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species. The Forest should provide to this office an explanation of the cause of the taking.

The Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of American peregrine falcon.

1. Conduct all projects with minimal or no disturbance to breeding peregrine falcons.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the following term and condition, which implements the reasonable and prudent measure described above, must be complied with. The term and condition applies to the Agua Caliente, Murphy, and Ramanote allotments. This term and condition is non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1.

The Forest Service shall monitor known peregrine falcon breeding and nesting sites, determining presence or absence and reproductive status (including number of young born or fledged). The Forest Service shall not conduct any surface-disturbing activities (i.e., fencing, construction of livestock improvements), or activities that create loud noises (i.e., blasting, use of heavy machinery) within 800 meters (0.5 mile) of active eyries from March 1 to July 15, annually.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Forest Service should continue to implement the Peregrine Falcon Recovery Plan as appropriate (USFWS 1984c). The Plan outlines recovery goals and objectives such as surveys in potential peregrine falcon habitat, monitoring population trends, site occupancy, and productivity, along with management actions aimed at maintaining nesting and foraging habitat, and documenting any reproductive difficulties of peregrine falcons and their young. The Service recommends using the methodology established by the Arizona Game and Fish Department for peregrine falcon surveying (Ward 1994). The Service recommends that annual reports of survey results and other information could be included with other monitoring requirements of this biological opinion.

2. The Forest Service should continue monitoring recreation uses in the area, document any activities with potential to disturb nesting peregrines (rock climbing, hang gliding, hiking, woodcutting, camping, hunting, etc.), and immediately notify the Service of any disturbance (Recovery plan task 213, USFWS 1984a:23).

3. The Forest Service should continue to improve allotment and range conditions above fair conditions, aiming to reach and maintain the highest quality condition the allotments can achieve (Recovery plan task 12 and 13, USFWS 1984a:21-22).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of implementation of any conservation recommendations.

(Note: capture or collection of peregrine falcon requires appropriate permits from Arizona Game and Fish Department and the Service.)

DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon locating a dead or injured threatened or endangered species, initial notification must be made to the Service's Division of Law Enforcement, 26 North McDonald, Suite 105, Mesa, Arizona, 85201, phone number 602/835-1957, within three working days of its finding. The Service can advise as to handling of dead or injured listed species. Written notification must be made within five calendar days and include the time, date, and location of the species, a photograph, and any other pertinent information. Care must be taken in handling injured species to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. Injured species should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed species survive, the Service should be contacted regarding the final disposition of the species.

If feasible, the Service will ensure that the remains of intact specimens of listed animal species to be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action.

CACTUS FERRUGINOUS PYGMY-OWL (*Glaucidium brasilianum cactorum*)

The Service did not concur with all not likely to adversely affect determinations for the cactus ferruginous pygmy-owl. The Forest requested that any non-concurrences be included in formal consultation.

Status of the Species

The Service listed the Arizona population of the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) (CFPO) on March 10, 1997 and was effective on April 9, 1997. CFPOs are a small bird, averaging 17 cm (6.75 in) in length. The average weight of a male is 62 g (2.2 oz), while females average 73 g (2.6 oz). CFPOs are reddish-brown overall, with a cream-colored belly streaked with reddish-brown. Their crown is lightly streaked, and paired black-and-white spots on the nape suggest eyes. They have no ear tufts and their eye color is yellow. Their tail is reddish-brown with darker stripes, and is relatively long for an owl.

The CFPO, in the Order Strigiformes, Family Strigidae, is one of four subspecies of ferruginous pygmy-owl. CFPOs are known to occur from lowland central Arizona south through western Mexico to the States of Colima and Michoacan, and from southern Texas south through the Mexican States of Tamaulipas and Nuevo Leon. It is unclear at this time if the ranges of the eastern and western populations of the ferruginous pygmy-owl merge in southern Mexico. However, genetic information indicates that eastern and western populations of the CFPO may be genetically dissimilar, as described below.

South of the area described above, *G. b. ridgwayi* replaces *G. b. cactorum*, and throughout South America, *G. b. brasilianum* is the resident subspecies (Fisher 1893, van Rossem 1937, Friedmann et al. 1950, Schaldach 1963, Phillips et al. 1964, de Schauensee 1966, Karalus and Eckert 1974, Oberholser 1974, Johnsgard 1988). Additionally Konig and Wink (1995) identified a fourth subspecies of ferruginous pygmy-owl, *G. b. stranecki*, from central Argentina.

Available information indicates that distinct eastern and western populations of CFPOs may be defined. CFPOs occur along the lower Rio Grande River and the coastal plain of southern Texas and northeastern Mexico. They also occur in lowland areas of northwestern Mexico and southern Arizona. Based on recorded locations, distribution of habitat, and elevation, it appears that eastern and western ranges of CFPOs are geographically isolated from one another and are ecologically distinct. In the US, the eastern and western portions of their range are separated by the basin-and-range mountains and intervening Chihuahuan Desert basins of southeastern Arizona, southern New Mexico, and western Texas. Although Grossman and Hamlet (1964) suggested that the CFPO's range included this US-Mexico border region, the CFPO has never been recorded in this 800-km (500-mi) wide area (Bailey 1928, Phillips et al. 1964, Oberholser 1974).

In Mexico, the eastern and western populations are separated by the highlands of the Sierra Madre Oriental and Occidental, and the Mexican Plateau. CFPOs are considered rare on the Mexican Plateau or above elevations of 1,212 m (4,000 ft) on the west, and above 404 m (1,000 ft) on the east (Friedman et al. 1950). Some sources describe the eastern and western ranges as contiguous at the southern end of its range, near the southern end of the Mexican Plateau in central Mexico (Johnsgard 1988). Other sources describe these two ranges as being disjunct (Burton 1973). In his description of the subspecies, van Rossem (1937) found that Texas specimens exhibited characteristics of both *G. b. cactorum* and *G. b. ridgwayi*. Ultimately, he did assign Texas ferruginous pygmy-owls to *G. b. cactorum*, but noted that Ridgway (1914, in van Rossem 1937) considered them distinct from *G. b. ridgwayi*, and left the taxonomy of Texas pygmy-owls to be *G. b. cactorum* (e.g., Oberholser 1974, Millsap and Johnson 1988).

In addition to geographic separation, eastern and western populations of CFPOs occupy different habitats. Although some broad similarities in habitat physiognomy are apparent (e.g., dense woodlands and thickets), floristically these eastern and western habitats are very dissimilar. The desertscrub and thornscrub associations in Arizona and western Mexico are unlike any habitats occupied by CFPOs in eastern Mexico and southern Texas. Also, the oak association habitat occupied on coastal plains in southern Texas is unlike any habitat available in the western portion of their range. However, the Tamaulipan Thornscrub habitat of the east and the riverbottom mesquite-cottonwood (*Prosopis-Populus)* bosque habitat once found in Arizona are more similar in physiognomy and to a slight degree in floristic makeup.

The potential for genetic distinctness further supports a distinction between eastern and western CFPO populations. The fact that CFPOs are likely nonmigratory throughout its range, suggests that genetic mixing across wide areas may be infrequent. Considerable variation in plumage between regional populations has been noted, including specific distinctions between Arizona and Texas populations (van Rossem 1937, Burton 1973, Tyler and Phillips 1978, Johnsgard 1988).

CFPOs were described by van Rossem (1937) based on specimens from Arizona and Sonora. Its shorter wings, longer tail, and generally lighter coloration distinguish it from *G. b. ridgwayi* and *G. b. brasilianum* (van Rossem 1937, Phillips et al. 1964). *G. b. cactorum* occurs in several color phases, with distinct differences between regional populations (Sprunt 1955, Burton 1973, Tyler and Phillips 1978, Hilty and Brown 1986, Johnsgard 1988). Some investigators (e.g., van Rossem 1937, Tewes 1993) have suggested that further taxonomic investigation may be needed. However, *G. b. cactorum* is widely recognized as a valid subspecies (Friedmann et al. 1950, Blake 1953, Sprunt 1955, Phillips et al. 1964, Monson and Phillips 1981, Millsap and Johnson 1988, Binford 1989). The American Ornithologists' Union (AOU) recognized *G. b. cactorum* in its 1957 Checklist of North American Birds (AOU 1957). Subsequent AOU lists did not address subspecies (AOU 1983). The Service, based on the publications of the above authorities, accepted *G. b. cactorum* as a subspecies in 1991 (56 FR 58804), and again in 1993 (58 FR 13045).

Limited genetic work has been completed to date on the CFPO. One genetic study compared extracted deoxyribonucleic acid (DNA) from 20 CFPOs in Texas with extracted DNA from CFPOs in Tamaulipas. Data obtained from that study indicated that there is very little genetic difference between CFPOs in Texas and those in eastern Mexico (Proudfoot 1996). In addition, the data indicated that there is a low level of genetic variation in the CFPO. Low genetic variation in a species can be a cause of concern for future stability of that species. Generally, populations without genetic variation are considered imperiled due to either the effect of low population numbers, increased chances of inbreeding, or both (Soule 1986).

Although based on a very small sample size, studies comparing DNA of CFPOs from Arizona versus those from Texas indicated that there is a one percent variation in the genetic makeup of CFPOs in Arizona versus those in Texas. This difference is generally considered significant by geneticists (G. Proudfoot, Texas A & M University, pers. comm., 1997), suggesting the eastern and western populations of CFPOs may be genetically dissimilar.

In 1999, genetic research will be conducted by Pima County which will study the genetic variation within the listed population in Arizona and analyze tissue samples collected in Mexico and Texas. This study will help determine if current populations of CFPOs in Arizona lack genetic variation relative to healthy populations and to clarify the genetic variability among populations.

The above information suggests that eastern and western populations of the CFPO may be distinct, based on geographic isolation, distribution and status of habitat, and potential morphological and genetic differences. Further, the status of the subspecies in Mexico is currently unclear.

Species distribution

According to early surveys referenced in the literature the CFPO, prior to the mid-1900s, was "not uncommon," "of common occurrence," and a "fairly numerous" resident of lowland central and southern Arizona in cottonwood forests, mesquite-cottonwood woodlands, and mesquite bosques along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers and various tributaries (Breninger 1898 *in* Bent 1938, Gilman 1909, Swarth 1914). Bendire (1888) noted that he had taken "several" along Rillito Creek near Fort Lowell, in the vicinity of present-day Tucson, Arizona. Records indicate that the CFPOs were initially more common in xeroriparian habitats (very dense thickets bordering dry desert washes) than more open, desert uplands (Monson and Phillips 1981, Johnson and Haight 1985a, Johnson-Duncan et al. 1988, Millsap and Johnson 1988, Davis and Russell 1990). The CFPO was also noted to occur at isolated desert oases supporting small pockets of riparian and xeroriparian vegetation (Howell 1916, Phillips et al. 1964).

The historic use of Sonoran desertscrub habitats by CFPOs is not as clear. A disproportionately low number of historical records from desertscrub habitats may be due to the focus of early collection efforts along rivers where humans tended to concentrate, while the upland areas received less survey. An additional hypothesis is offered by Johnson and Haight (1985a), who suggest that CFPOs adapted to upland associations and xeroriparian habitats in response to the demise of Arizona's riparian bottomland woodlands. It is also possible that desertscrub habitats simply are of lesser quality for CFPOs and have always been occupied by CFPOs, but at lower frequency and density (Johnson and Haight 1985b, Taylor 1986). Historical records of CFPOs do exist for Sonoran desertscrub in areas such as the Santa Catalina foothills and in "groves of giant cactus" near New River, north of present-day Phoenix. Kimball (1921) reported one CFPO in a mesquite tree in the foothills of the Santa Catalina Mountains. Fisher (1893) took two CFPO specimens near New River, and observed "several others" in mesquite and large cacti.

The range of CFPOs in Arizona extends from the International Border with Mexico north to central Arizona. The northernmost historic record for the CFPO is from New River, Arizona, approximately 56 km (35 mi) north of Phoenix, where Fisher (1893) reported the CFPO to be "quite common" in thickets of intermixed mesquite and saguaro cactus. The Museum of Vertebrate Zoology contains a clutch of four eggs collected by G. F. Breninger on May 18, 1898 in Phoenix, Maricopa County. One additional record exists for this northern portion of the CFPO's range, and is filed under R. D. Lusk with the United States National Museum Smithsonian Institution. This record indicates that five eggs were collected at Cave Creek on April 12, 1895 (USNM 1996). CFPOs were also detected in central Arizona at the Blue Point Cottonwoods area, at the confluence of the Salt and Verde rivers, in 1897, 1949, 1951, and 1964 (AGFD unpubl. data, Phillips et al. 1964). Additionally, CFPOs were detected at Dudleyville on the San Pedro River as recently as 1985 and 1986 (AGFD unpubl. data, Hunter 1988).

The easternmost record for the CFPO is from 1985 at the confluence of Bonita Creek and the Gila River. Other records from this eastern portion of the CFPO's range include a 1876 record from Camp Goodwin (current day Geronimo) on the Gila River, and a 1978 record from Gillard Hot Springs, also on the Gila River. CFPOs have been found as far west as the Cabeza Prieta Tanks in 1955 (Monson 1998).

Over the past several decades, CFPOs have been primarily found in Sonoran desertscrub communities in southern and southwestern Arizona consisting of palo verde *(Cercidium* spp.), ironwood *(Olneya tesota)*, mesquite, acacia, bursage (*Ambrosia* spp.), and columnar cacti (Phillips et al. 1964, Monson and Phillips 1981, Davis and Russell 1984, 1990, Johnson and Haight 1985a, Johnsgard 1988). Regardless of past distribution in riparian areas, it is clear that the CFPO has declined throughout Arizona to the degree that it is now extremely limited in distribution in the state (Johnson et al. 1979, Monson and Phillips 1981, Davis and Russell 1984, AGFD 1988, Johnson-Duncan et al. 1988, Millsap and Johnson 1988, Monson 1998).

Hunter (1988) found fewer than 20 verified records of CFPOs in Arizona for the period of 1971 to 1988. Although CFPOs are diurnal and frequently vocalize in the morning, the species was not recorded or reported in any breeding bird survey data in Arizona (Robbins et al. 1986). Formal surveys for the CFPO on Organ Pipe Cactus National Monument (OPCNM) began in 1990, with one located that year. Beginning in 1992, survey efforts conducted in cooperation with the AGFD, three single CFPOs were located on the Monument (Fish and Wildlife Service and National Park Service, unpubl. data, 1992).

In 1993, surveys were conducted at locations with CFPO sightings from 1970 or later. These areas included the lower San Pedro River from Cascabel to Winkelman, northwest Tucson, east Tucson from Sabino Canyon to Tanque Verde Wash, the lower elevations of Saguaro National Park, Rincon Mountain District, Rincon Creek from the X-9 Ranch to Thunderhead Ranch, and the confluence of the Salt and Verde rivers. Only one CFPO was detected during these survey periods, and it was located in northwest Tucson (Felley and Corman 1993).

Surveys were again conducted in 1994 at Catalina State Park north of Tucson, Winkelman, the Aravaipa Creek confluence, near Mammoth, and at Bingham Cienega along the lower San Pedro River, Cabeza Prieta National Wildlife Refuge, Picacho Reservoir, Sycamore Canyon in the Pajarito Mountains, and at the confluence of the Salt and Verde rivers. These surveys yielded no CFPO detections (Collins and Corman 1995).

In 1996, AGFD focused survey efforts in northwest Tucson and Marana and detected a total of 16 CFPOs, two of which were a pair, and two of which were fledglings. Three additional CFPOs were detected at OPCNM in 1996. There were also three additional but unconfirmed reports of CFPOs from OPCNM.

In 1997, survey efforts of AGFD located a total of ten CFPOs in the Tucson Basin study area, which is roughly bounded on the north by the Picacho Mountains on the east by the Santa Catalina and Rincon Mountains, on the south by the Santa Rita and Sierrita Mountains, and on the west by the Tucson Mountains. Eight of the ten CFPOs were found in the northwest Tucson area, and the remaining two were found on the western bajada of the Tortolita Mountains. Of the eight CFPOs documented from northwest Tucson in 1997, one pair successfully fledged four young. The remaining three CFPOs included a single adult in the northwest Tucson area and the two CFPOs found on the western bajada of the Tortolita Mountains. Nine of the CFPOs were located during the nesting season, while three were located in the fall. Of the three CFPOs located in the fall, two were known to be from the nest site. It is unknown if the third CFPO located in the fall was from the known nest site for that year. This CFPO was located more than three kilometers (2 mi) from the nest site, and was counted as the tenth CFPO for 1997 (AGFD, unpubl. data, 1997). Two adult males were also located at OPCNM 1997, with one reported from a previously unoccupied area (T. Tibbitts, OPCNM, pers. comm., 1996).

In 1998, a total of 35 CFPOs were observed, including 11 juveniles in the Tucson basin, and five juveniles at OPCNM (S. Richardson, AGFD, pers. comm.; M. Richardson, USFWS, unpubl. data; Tibbitts, OPCNM, pers. comm.; D. Bieber, Coronado National Forest, pers. comm.). Three adults were found along xeroriparian drainages in semidesert grassland in southern Arizona, and two adults were also located in Pinal County. One adult was located in eastern Tucson as well (USFWS, unpubl. data). The Service believes that the increase in the number of observed owls in 1998 is largely due to increased survey effort from previous years, and location of successful nest sites.

As of early July 1999, survey results during the recently completed 1998-99 survey season have resulted in at least 41 adult CFPOs documented in Arizona (S. Richardson, AGFD, pers. comm., 1999). Six adult CFPOs were documented in southern Pinal County, 11 adults in the northwest Tucson area, 19 adults in riparian woodlands and xeroriparian habitats in semidesert grasslands and upland Sonoran desertscrub habitat in southern Arizona, and five adults at OPCNM. Nesting was confirmed at least 11 of these sites, with 37 young documented and as of late June, 27 young still alive. As with other owls and raptors, a high mortality (50 percent or more) of young is typical during the first year of life.

Life History

The CFPO is crepuscular/diurnal, with a peak activity period for foraging and other activities at dawn and dusk. They can often be heard calling throughout the day, but most activity is reported between one hour before sunrise to two hours after sunrise, and late afternoon/early evening from two hours before sunset to one hour after sunset (Collins and Corman 1995).

CFPOs are known to use many habitat types. Within Arizona, they are known to occur in riparian woodlands, mesquite bosques, and Sonoran desertscrub communities as well as in non-native habitat within these communities. While plant species diversity differs between these communities, there are certain unifying characteristics in each of these occupied habitat types. These unifying characteristics include the presence of vegetation in a fairly dense thicket or woodland, the presence of trees or cacti large enough to support cavity nesting, and elevations below 1,616 m (4,000 ft). Historically, CFPOs were associated with riparian woodlands in cen-tral and southern Arizona. Plants present in these riparian communities include cottonwood, willow (*Salix* spp.) and hackberry (*Celtis* spp.). Cottonwood trees are suitable for cavity nesting, while the density of mid- and lower-story vegetation provides necessary protection from predators and an abundance of prey items for the carnivorous CFPO. Mesquite bosque communities are dominated by mesquite trees, and are described as mesquite forests due to the density and large trees.

The Arizona Upland Subdivision of the Sonoran Desert provides an over-story of mature saguaros (*Carnegiea gigantea*) which are suitable for cavity nesting, as well as large mesquites and other trees which may additionally be used for nesting. Saguaro cavities are also used for roosting, perching, and caching food (Smith 1996). The mid- and lower-stories are comprised of a variety of mesquite, palo verde, ironwood, acacia *(Acacia* spp.), bursage, graythorn (*Zizyphus obtusifolia*), cholla (*Opuntia* spp.), prickly pear (*Opuntia* spp.), and annual and perennial grass species. As in riparian habitat, the larger trees provide perches for foraging and protection from predators. Adequate vegetation in mid- and lower-stories appears to be important, and likely provide protection from predators and a higher density of prey items including lizards, small birds and mammals, and insects.

In southern Texas, CFPO habitat includes coastal plain oak (*Quercus virginiana*.) associations as well as the Tamaulipan Thornscrub of the lower Rio Grande valley region, which is comprised of mesquite, hackberry, oak, and Texas ebony *(Pithecellobium ebano)* (Griscom and Crosby 1926, Bent 1938, Oberholser 1974, Tewes 1993, Wauer et al. 1993). In northeastern Mexico, they occur in lowland thickets, thornscrub communities, riparian woodlands, and second-growth forest (van Rossem 1945, AOU 1983, Enriquez-Rocha et al. 1993, Tewes 1993). In central and southern Arizona, their primary habitats are riparian cottonwood forests, mesquite bosques, and Sonoran desertscrub, although most recent observations have occurred primarily in Sonoran desertscrub associations of palo verde, bursage, ironwood, mesquite, acacia, and giant cacti such as saguaro and organ pipe (*Stenocereus thurberi*) (Gilman 1909, Bent 1938, van Rossem 1945, Phillips et al. 1964, Monson and Phillips 1981, Johnson-Duncan et al. 1988, Millsap and Johnson 1988). Farther south in northwestern Mexico, CFPOs occur in Sonoran desertscrub, Sinaloan thornscrub, and Sinaloan deciduous forest as well as riverbottom woodlands, cactus forests, and thornforest (Enriquez-Rocha et al. 1993). The diet of the CFPO includes birds, lizards, insects, small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974), and frogs (Proudfoot et al. 1994b).

While the majority of CFPO detections the last six years are from the northwest Tucson area, CFPOs have also been detected in southern Pinal County, at OPCNM, on the Buenos Aires National Wildlife Refuge (BANWR), and on the Coronado National Forest. CFPOs at OPCNM have been detected in Sonoran desertscrub habitat dominated by saguaro, creosotebush (*Larrea tridentata*), velvet mesquite (*P. velutina*), palo verde, cat-claw acacia, white brittlebush (*Encelia farinosa*), triangle-leaf bursage, and ironwood. Small washes in the area support salt cedar (*Tamarix pentandra*) and canyon ragweed (*A. ambrosioides*). In addition, relatively large mesquite bosques are present in some areas (Collins and Corman 1995). On the BANWR and adjacent areas in the Altar Valley, CFPOs have been located within riparian habitat in semidesert grassland communities. Vegetation in these riparian areas included netleaf hackberry, velvet mesquite, Arizona ash (*Fraxinus velutina* var. *velutina*), acacia, and Mexican elderberry (*Sambucus caerulea*).

Non-migratory Status

CFPOs are considered non-migratory throughout their range by most authors, and have been reported during the winter months in several locations, including OPCNM (R. Johnson, unpubl. data, 1976, 1980, Tibbitts, pers. comm., 1997). Major Bendire collected CFPOs along Rillito Creek near Camp Lowell at present-day Tucson on January 24, 1872. The University of Arizona Bird Collection contains a female CFPO collected on January 8, 1953 (University of Arizona 1995). Similarly, records exist from Sabino Canyon documenting CFPOs as present on December 3, 1941, and December 25, 1950 (US Forest Service, unpubl. data). These winter records demonstrate that CFPOs are found within Arizona throughout the year, and do not appear to migrate to warmer climates to the south during the winter months. However, Russell and Monson (1998) postulated that they may be migratory in the northern portion of their range.

Nesting

CFPOs nest in a large cavity in a tree or large columnar cactus. These cavities may be naturally formed (e.g., knotholes) or excavated by woodpeckers, and nest lining material may or may not be present. Researchers in Texas noted that one pair of CFPOs removed material from a cavity prior to laying eggs one year, but laid eggs on material in the nest cavity the following year (Proudfoot et al. 1994b). Breninger (1898) noted that no nest lining was used at one observed nest. Whether or not a nest lining is actually constructed, it is likely that prey remains, including feathers and other materials, build up on the nest cavity floor over its use.

CFPOs begin nesting activities in late winter to early spring. Breninger (1898) noted that nesting along the Salt and Gila rivers began about the 20th of April. An additional record indicates that five eggs were collected on the 12th of April (USNM 1996). Bent (1938) noted that George

Sennett took one egg and an adult female at Canon del Caballeros near Victoria, Tamaulipas, Mexico on May 2, 1988.

With respect to current research, much of the specific timing of CFPO nesting chronology is unknown due to limited opportunities for study and the secretive nature of the CFPO. Data generated from nest box studies in Texas indicated that CFPOs lay eggs from mid- to late-April. Eggs were laid asynchronously, with one egg laid every 32 to 39 hours until the entire clutch of four to five eggs has been laid (Proudfoot 1996). Incubation continued for 21 to 23 days, with eggs hatching asynchronously at a rate of one egg hatching every 20 to 26 hours. Fledging occurred 26 to 28 days after hatching was complete (Proudfoot 1996).

Applying this information to the 1996 nest in Arizona, along with observed copulation and fledging dates, the Arizona Game and Fish Department determined a nesting chronology for Arizona CFPOs. Copulation was observed on March 31, and egg laying was estimated to have taken place from April 6 to April 11, with the onset of incubation estimated to have taken place from April 7 to April 12. Hatching was estimated at May 9. Fledging was confirmed on June 4 (Abbate et al. 1996). While the intermediate dates are estimates, the copulation and fledging dates are confirmed, and provided recent, confirmed starting and ending dates for nesting chronology in Arizona. Information from a nest located in 1995 confirms that fledging occurred on July 29. Working backwards and using information gained from additional CFPO nests, it was estimated that egg laying took place around May 31 to June 5, with the onset of incubation at June 1 to June 6, and hatching from June 30 to July 3. The difference between fledging from these two nest sites is approximately two months. As with other avian species, this may be the result of a second brood or a second nesting attempt following an initial failure (Abbate et al. 1996).

In both Texas and Arizona, observations indicate that the female incubates the eggs and attends hatchlings, while the male provides food to the female and young. In Texas, studies noted that males provided all of the food collected for the females and their young for approximately the first week following hatching (Proudfoot 1996). In Arizona, the majority of hunting activity and prey captures by male CFPOs were conducted away from the nest site and, consequently, out of sight of nest observers (Abbate et al. 1996).

Dispersal

According to studies conducted in Texas, juveniles remained within approximately 50 m (165 ft) of adults until dispersal. Dispersal occurred approximately 63 days after the young first left the nest. Dispersal distances (straight line) of six juveniles from their natal sites to nest sites the following year in Texas ranged from 17.3 (10.8 mi) to 1.93 km (1.23 mi) (unpubl. data 1999). One banded juvenile from Arizona was observed approximately three km (2 mi) from its nest site following dispersal (S. Richardson, AGFD, pers. comm., 1997). Radio telemetry studies conducted by AGFD in the Tucson basin in 1998 showed dispersal distances of young fitted with transmitters to be up to 10 km (6 mi)(in straight line distance), typically occurring from July through September (S. Richardson, AGFD, pers. comm., 1998). They found that juveniles may move up to 1.6km (1 mi) in a night, however, they appear to fly from tree to tree instead of long single flights (S. Richardson, AGFD, pers. comm., 1998). Subsequent surveys during the spring of 1999 have found that their locations are in the same general location as last observed the preceding fall. Studies are currently ongoing to gather more information in dispersal distances in Arizona by AGFD.

Prey

The CFPO's diverse diet includes birds, lizards, insects, and small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974) and frogs (Proudfoot et al. 1994a). Bendire (1888) indicated that CFPOs were known to carry off young chickens. Recent studies in Texas confirmed that CFPOs take prey from a variety of animal classes, with the highest number of prey items from the Insecta and Reptilia classes (Proudfoot et al. 1994a). Prey items by the female at the nest site included house finches, black-tailed gnatcatchers, lizards, and cicadas. Observed prey bird size range from mourning doves (*Zenaida macroura*) to hummingbirds (*Trochilidae* fam.) indicating CFPOs are capable of taking prey considerably heavier than their own weight and a wide variety of bird species (Proudfoot, pers. comm., 1998; S. Richardson, AGFD, pers. comm., 1998). Studies in both Texas and Arizona indicate that lizards are the predominant prey item for CFPOs. Proudfoot noted that while insects make up a higher number of individual prey items, lizards constitute the largest percentage of the biomass (Proudfoot, pers. comm.; 1997, S. Richardson, AGFD, pers. comm., 1997). Abbate et al. (1996) noted that, of 84 prey items either captured near or delivered to the nest, 60 percent were lizards, while birds accounted for 8.3 percent, and mammals for 4.8 percent. Cicadas were the only insect large enough to be identified during nest monitoring, and represented 4.8 percent of total prey items. The remainder of the prey items could not be identified through observation. Seasonal variations in prey availability and abundance may affect prey taken by CFPOs; however, further research is needed to determine these fluctuations.

Home Range

Based on visual and auditory detections of an adult pair and one fledgling at a 1996 nest site, Abbate et al. (1996) estimated a breeding season home range size for CFPOs in Arizona. By following the adult female and the fledgling, it was noted that the size of the area used by the female and fledgling expanded as the fledging grew older. In fact, the fledgling was observed at what may have been the northern and southernmost points in the home range area. In contrast, the adult male appeared to be using the same size area during incubation as he did during the nestling stages. The adult female was observed to use an area approximately 0.2 ha (0.5 acres) in size during the pre-fledgling and nesting stages. However, this area expanded to approximately 14 ha (35 ac) post-fledging, and the 14-ha (35-ac) area was also used by the fledgling. Following dispersal of the fledgling, it was believed that the area used by the adult CFPOs expanded beyond the 14-ha (35-ac) area (Abbate et al. 1996). An additional pair of CFPOs was found in the late fall of 1997. Researchers in Arizona indicated that this pair used approximately 64 ha (160 acres)(S. Richardson, AGFD, pers. comm., 1997).

Studies at OPCNM have indicated that CFPOs occupy a home range varying from 1 to 8 ha (3-20 ac) during the breeding season. Researchers at OPCNM have also noted that CFPOs habitually use a central area within that acreage (Tibbitts, OPCNM, pers. comm., 1997).

In Texas, Proudfoot (1996) using radio telemetry determined that the area used by adult male CFPOs during the incubation period ranged in size from 1 to 9 ha (3-21 ac), with a mean size of 4 ha (10 acres). Proudfoot (1996) further determined that CFPOs of unknown sex used an area ranging from 19 to 115 ha (48-287 ac), with a mean of 68 ha (172 ac) in late fall. Additionally, Proudfoot (1996) notes that, while CFPOs used between 1 and 9 ha (3 and 21 ac) during the breeding season, they would defend areas up to 279 acres, indicating that their total territory may encompass an area at least 110 ha (279 ac) in size. Proudfoot (pers. comm. 1999) indicated that pairs utilize an area within 600 meters (1,969 feet) of their nest site. Proudfoot (pers. comm., 1997) has stated that his data indicate that the acreage necessary to successfully raise young is approximately 39.5 ha (98.8 ac). He hypothesizes that the decreased availability of prey items such as insect and reptiles during the colder months may mean that CFPOs forage over larger areas during the winter in order to access a suitable forage base (Proudfoot 1996).

Critical Habitat

The Service proposed 180 river kilometers (290 mi) of critical habitat in Arizona on December 1994 (59 FR 63975) but determined such designation not prudent in the final rule on March 1997 (62 FR 10730). In 1997, the Southwest Center for Biological Diversity filed a lawsuit for the failure to designate critical habitat. In October 1998, the court found in favor of the Plaintiffs, and in November of the same year ordered "...within 30 days of the date of this Order, the Secretary shall issue the Proposed Rules for designating critical habitat for the pygmy-owl..and within six months of issuing the Proposed Rules, the Secretary shall issue final decisions regarding the designation of critical habitat for the pygmy-owl..." On December 30, 1998, the Service proposed approximately 290,000 ha (725,500 ac) of critical habitat in southern and central Arizona (63 FR 71820). Areas with most of the recent CFPO occurrences and areas believed to be important to genetic and demographic interchange were identified and proposed as critical habitat. The Service published a final rule (USFWS 1999a) on July 12, 1999 which designated approximately 296,115 ha (731,712 ac) of riverine riparian and upland habitat in Pima, Cochise, Pinal, and Maricopa counties in Arizona.

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

The Service determined that the CFPO in Arizona was endangered because of the following three factors (62 FR 10730):

1. present or threatened destruction, modification, or curtailment of its habitat or range;
2. inadequacy of existing regulatory mechanisms; and
3. other natural or manmade factors, which included low genetic variability.

The Service believes that the past and present destruction, modification, or curtailment of habitat is the primary reason for the decrease in population levels of the CFPO.

Riparian bottomland forests and bosques, which historically supported the greatest abundance of CFPOs and have been extensively modified and destroyed by clearing, urbanization, water management, and hydrological changes (Willard 1912, Brown et al. 1977, Rea 1983, Szaro 1989, Bahre 1991, Stromberg et al. 1992, Stromberg 1993b). Cutting of trees for domestic and industrial fuel wood was so extensive throughout southern Arizona that, by the late 19th century, riparian forests within tens of mile of towns and mines had been decimated (Bahre 1991). Mesquite was a favored species because of its excellent fuel qualities. The famous, vast forests of "giant mesquites" along the Santa Cruz River in the Tucson area described by Swarth (1905) and Willard (1912) fell to this threat, as did the "heavy mesquite thickets" where Bendire (1888) collected CFPO specimens along Rillito Creek, a Santa Cruz River tributary, in present-day Tucson. Only remnant fragments of these bosques remain.

It is estimated that between 85 to 90 percent of low-elevation riparian habitats in the southwestern US have been modified or lost; these alterations and losses are attributed to urban and agricultural encroachment, woodcutting, water diversion and impoundment, channelization, livestock overgrazing, groundwater pumping, and hydrologic changes resulting from various land-use practices (e.g., Phillips et al. 1964, Carothers 1977, Kusler 1985, AGFD 1988, USFWS 1988b, US GAO 1988, Jahrsdoerfer and Leslie 1988, Szaro 1989, Dahl 1990, State of Arizona 1990, Bahre 1991).

CFPO status information for Mexico is also very limited, but some observations suggest that, although habitat loss and reduced numbers are likely to have occurred in northern portions of the two subspecies ranges in Mexico, the CFPO persists as a locally common bird in southern portions of Mexico. Habitat loss and population status are summarized below for the four populations of the CFPO.

Cottonwoods also were harvested for fuel wood, fenceposts, and for bark which was used as cattle feed (Bahre 1991). In recent decades, riparian habitats used by CFPOs have continued to be modified and destroyed by agricultural development, woodcutting, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Bahre 1991, Stromberg et al. 1992, Stromberg 1993b). Sonoran desertscrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991).

In addition to clearing woodlands, the pumping of groundwater and the diversion and channelization of natural watercourses are also likely to have reduced CFPO habitat. Diversion and pumping result in diminished surface flows, and consequent reductions in riparian vegetation are likely (Brown et al. 1977, Stromberg et al. 1992, Stromberg 1993b).

Channelization often alters stream banks and fluvial dynamics necessary to maintain native riparian vegetation. The series of dams along most major southwestern rivers (e.g., the Colorado, Gila, Salt, and Verde) have altered riparian habitat downstream of dams through hydrological and vegetational changes, and have inundated former habitat upstream. A comprehensive CFPO habitat assessment analysis has not been completed within the Coronado National Forest; however, based on the limited information currently available, much of the potential suitable habitat is likely to be located within riparian habitats.

Direct results of livestock grazing include removal of vegetative cover and trampling of grass and brush. Indirect or delayed effects of grazing include altered forage composition, reduced vigor of plants, and accelerated soil erosion resulting in a reduction of land productivity. Long-term effects of heavy grazing often result in vegetative changes toward more xeric conditions (Wiens and Dryer 1975). Deterioration of western riparian systems began with severe overgrazing in the late nineteenth century (Chaney et al. 1990). Unfortunately, assessing the true impacts of livestock grazing in riparian systems is difficult since there was no baseline information from which to draw significant conclusions (Krueper 1995). However, many studies have looked at the effects of grazing on vegetative communities and the response of wildlife species to various grazing intensities.

Livestock overgrazing in riparian habitats is one of the most common causes of riparian degradation (Ames 1977, Carothers 1977, Behnke and Raleigh 1978, USFS 1979, US GAO 1988). Effects of overgrazing include changes in plant community structure, species composition, relative species abundance, and plant density (Bock et al. 1990). These changes are often linked to more widespread changes in watershed hydrology (Brown et al. 1977, Rea 1983, US GAO 1988), and are likely to affect the habitat characteristics essential to the CFPO. Blydenstein et al. (1957) found that heavy livestock use reduced biomass and diversity of annual forbs and grasses, and changed the composition of shrub species. Grazed riparian areas typically have less ground cover, a poorly developed understory and midstory, and decreased vegetative biomass when compared to similar ungrazed riparian areas (Krueper 1995).

Jones (1981) found that grazing reduced lizard abundance and variety in a number of habitats in western Arizona. Pianka (1966) discussed the importance of vegetative structure, and found vegetative communities with increased plant structures supported more lizard species than those with less structure. In general, complex vegetative communities with a high degree of species diversity and structural heterogeneity provide habitat for many prey species including avian, insects, and mammals. Riparian communities, particularly where willows are found, support one of the richest and diverse insect fauna among plant communities which are also important to fish, amphibians, reptiles, birds, and small mammals (Southwood 1961). In addition, birds have been shown to respond to alterations in vegetative structure and species richness within riparian habitats (Bull and Slovin 1982, Szaro and Jakle 1985). Higher densities and diversity of birds have been found in ungrazed riparian habitats compared to adjacent grazed areas (Crouch 1981, Mosconi and Hutto 1981, Taylor 1986).

Grazing pressure on vegetation has also been shown to alter growth form, plant vigor and plant species composition, resulting in increases or decreases in populations of bird species (Glinski 1977, Townsend and Smith 1977, Ryder 1980). Excessive livestock grazing can also affect types and abundance of food items for birds (Ryder 1980) and effects on small mammals may be similarly impacted (Krueper 1995). Raptors which utilize small mammals as prey may not choose to frequent submarginal riparian habitats for feeding due to lack of preferred prey items. Additionally, insect biomass may be decreased in riparian habitats which are heavily grazed due to the lack of understory vegetation (Krueper 1995). This can be particularly important to the CFPO since reptiles, birds, and small mammals are important prey species.

Livestock will spend 5 to 30 times longer in riparian habitats than adjacent uplands, and typically congregate in floodplains in hotter dryer summer months imposing heavy use during the heart of the growing season, and in many instances throughout the growing season (Skovlin 1984). In many areas of the West, the concentration of livestock in riparian habitats is exacerbated due to steep canyons, narrow riparian corridors, and limited accessability (Dahlem 1979). These conditions are typical in areas which are likely to contain suitable CFPO habitat on the Coronado National Forest. Therefore, there is a potential for negative impacts from grazing on these habitats which may be important to CFPOs for food, cover, and nesting in these areas.

Steenbergh and Lowe (1977) looked at saguaro density and recruitment within Saguaro National Park where, until recently, it was grazed by livestock. In addition, Burgess (1964) examined saguaro populations on the Tonto National Forest. They found that in Sonoran desertscrub habitats, direct destruction of young saguaros has resulted from the trampling of cattle seeking shade and forage beneath the crowns of desert trees, particularly palo verde and mesquite. They also found that livestock grazing has had the greatest impact in non-rocky habitats where germination, establishment, and survival of young saguaros are most directly dependent upon the physical protection of other vegetation. Grazing in rocky habitats has had far less impact upon young saguaro recruitment. They summarized that grazing has reduced the density of saguaro populations by decreasing the number of sites suitable for germination and establishment of young plants by increasing exposure to natural mortality-causing factors. Therefore, since all recent nest cavities used by CFPOs have been in saguaros in non-rocky habitat, activities which affect saguaro recruitment could be significant.

The trend of Sonoran desertscrub habitats and CFPO occupancy is not as clear. Historical records from this habitat in Arizona are few. This may be due to disproportionate collecting along rivers where humans were concentrated, while the upland deserts were less intensively surveyed.

Low genetic variability can lead to a lowering in reproductive success and environmental adaptability. Caughley and Gunn (1996) further note that small populations can become extinct entirely by chance even when its members are healthy and the environment favorable.

Further, because the CFPO appears to be nonmigratory, there may be an additional limitation on the flow of genetic material between populations which may reduce the chance of demographic and genetic rescue from immigration from adjacent populations.

Environmental, demographic, genetic stochasticity, and catastrophes have been identified as interacting factors that might contribute to a population's extinction (Hunter 1996). Environmental stochasticity refers to random variation in habitat quality parameters such as climate, nutrients, water, cover, pollutants, and relationships with other species such as prey, predators, competitors, or pathogens. Demographic stochasticity is uncertainty due to random variation in reproductive success and survivorship of individuals. Genetic stochasticity is the random variation in gene frequencies of a population due to genetic drift, bottlenecks, inbreeding, and similar factors. Inbreeding between CFPOs has been documented in the Tucson area (S. Richardson, AGFD, pers. comm., 1998). Catastrophes are events such as droughts or hurricanes that occur randomly. When these factors interact with one another, there are likely to be positive feedback loops, or snowballing of effects, such that a random environmental change like habitat fragmentation can result in population and genetic changes by preventing dispersal. These factors are much more likely to cause extinction when a species' numbers are already extremely low. The small, fragmented population of CFPOs in Arizona may not have the ability to resist change or dramatic fluctuations over time caused by one or more of the factors mentioned above.

CFPOs are highly sought by bird watchers, who concentrate at a few of the remaining known locations in the United States. Limited, careful bird watching is probably not harmful, however, excessive attention by bird watchers may at times constitute harassment and affect the occurrence and behavior of the CFPO (Oberholser 1974, Tewes 1993). For example, in early 1993, one of the few areas in Texas known to support CFPOs continued to be widely publicized (American Birding Association 1993). Resident CFPOs were found at this highly-visited area only early in the breeding season, and while later in the season they could not be detected. O'Neil (1990) also indicated that five birds initially detected in southern Texas failed to respond after repeated visits by birding tours. It is unknown if the birds habituate to the playing of taped calls and stopped responding, or if they abandoned the area. Oberholser (1974) and Hunter (1988) additionally indicated that in southern Texas, recreational birdwatching may disturb owls at highly visited areas.

Trichomoniasis is a disease which may potentially affect CFPOs. Because they prey on finches, sparrows, and other seed-eating birds known to carry trichomoniasis, they have a higher risk of contracting the disease. According to Boal and Mannan (1996), raptors in urban areas experience a higher exposure rate to trichomoniasis, resulting in high mortality of raptor nestlings. No studies have been completed to date on the CFPO in urban or other areas to determine if, in fact, they have been affected by this disease; however studies have recently been initiated (S. Richardson, AGFD, pers. comm. 1999).

Proudfoot (pers. comm., 1996 and 1998) found that snake predation may be an additional factor adversely affecting the CFPO population on the Norias Division of the King Ranch in Texas. He documented CFPO eggs and nestlings in nest boxes being eaten by an indigo snake (*Drymarchon corais)*. Proudfoot notes that, from 1993 to 1996, 8 out of 112 available nest boxes (or 232 nest box opportunities) were used by CFPOs. Where metal flashing was placed around trees to prevent the possibility of predation by snakes, eggs were not disturbed. For the four nest boxes left unprotected, three had eggs eaten before they hatched, and in the fourth the hatchlings were eaten. Proudfoot further noted that fecundity (the number of young successfully raised per year), for natural cavities was approximately one-third that of fecundity for nest boxes, and speculates that eggs and birds in natural cavities were likely to have been eaten by both snakes and long-tailed weasels (*Mustela frenata*), resulting in a lower fecundity rate (G. Proudfoot, pers. comm., 1996 and 1998). Proudfoot is currently investigating the possibility that predation in nest boxes may increase as predators learn to key in on them.

Pesticides may pose an additional threat to the CFPO, as it occurs in floodplain areas that are now largely agricultural. Jahrsdoerfer and Leslie (1988) note that more than 100 pesticides are used on agricultural crops throughout the lower Rio Grande Valley, with use beginning in the late 1940's. Pesticide application occurs year-round. Because crops, such as cotton, are grown repeatedly year after year, an accumulation of resistant pesticides may result. Pesticide contamination is described as "widespread" throughout the inland waters of the lower Rio Grande Valley, and includes concentrations of DDT, dieldrin, endrin, lindane, endosulfan, Guthion, and PCBs which exceeded 1976 EPA criteria for propagation of fish and wildlife. Without appropriate precautions, these agents may potentially affect CFPOs through direct toxicity or effects on their food base. No quantitative data on the effects of this potential threat on the CFPO are known at this time, however, the effects of pesticides such as DDT on the reproductive success of other bird species are well known.

An additional potential threat to the CFPO is low recruitment. Recruitment is the number of young who survive long enough to leave the nest per nesting attempt. Proudfoot (1996) found through a study of four active nest cavities that only one was successful in fledging young. The recruitment rate for this study was 1.0 (four nesting attempts with four young fledging from one nest, while the other three nests failed). We do not know what recruitment rate would be necessary for CFPOs because of the lack of information on reproduction, longevity, natality, and mortality for this subspecies. However, Proudfoot estimated that, based on information for the eastern screech owl (*Otus asio)*, a recruitment rate of 2.25 was necessary for a stable CFPO population. AGFD is currently investigating what the recruitment rate for CFPOs is in the Tucson area (S. Richardson, AGFD, pers. comm., 1999) .

CFPOs were historically widespread in and immediately adjacent to the project area. Hunter (1988), Russell *in litt.* 1998, and the AGFD Heritage Data Management System (HDMS) list 18 records of CFPOs from the Santa Catalina Mountains, 1 record from the Santa Rita Mountains, 3 records from Sonoita Creek, 4 records from the Atascosa Mountains, 2 from the Rincon Mountains, one recent location within 1.6 km (1 mi) of the National Forest in the San Luis Mountains. The below table lists each CFPOs documented within the vicinity of the project area for each region (EMA), the date collected, number of records, and reference.

Santa Catalina Mountains (Santa Catalina EMA)

1896 (Swarth, H.S.)
1918 (Kimball, H.H.)
1920 (3 records) (Kimball, H.H.)
1922 (Kimball, H.H.)
1941 (3 records) (Thornberg, F.)
1950 (USFS 1998)
1951 (Marshall, J.T. Jr.)
1953 (Murphy, C.L.)
1963 (Marshall, J.T. Jr.)
1973 (2 records) (Davis, W.A.)
1976 (2 records) (Demaree, S.)
1980s (HDMS 1998)

Rincon Mountains (Santa Catalina EMA)

1995 (HDMS)
1998 (USFS)

Sonoita Creek (adjacent to both Huachuca and Santa Rita EMAs)

1975 (2 records) (Hunter 1988)
1985 (Bates J.)

Tucson - Marana Area (adjacent to the Santa Catalina EMA

1872 to present (over 35 individual records) (Russell *in litt.* 1998, HDMS 1998)

Santa Rita Mountains (Santa Rita EMA)

1975 (Hunter 1988)

Atascosa Mountains (Tumacacori EMA)

1979 (Taylor, R.C)
1981 (Stejskal, D)
1986 (Corman, T, & D. Krueper)
1986 (Nieman, R.)

San Luis Mountains (Tumacacori EMA)

1999 (Flesch, A.)

Recently, most of the CFPOs have been found within the palo verde-mixed cacti series of the Arizona Upland Subdivision of Sonoran desertscrub, and riparian and xeroriparian habitats within semi-desert grasslands classified by Brown (1982). Occupied sites in Sonoran desertscrub are characterized by an abundance of saguaros or large trees, and a diversity of plant species and vegetation strata. Xeroriparian habitats contain a rich diversity in plants that support a wide array of prey species and provide cover. The density of annuals and grasses, as well as shrubs, are important to the CFPO's prey base. Shrubs and large trees provide protection against aerial predation for juvenile and adult CFPOs. Saguaros and large trees provide substrate for nesting cavities in Sonoran desertscrub, while trees with cavities provide nesting strata in deciduous forest riparian habitats.

Currently, one of the highest known concentration of CFPOs is found in the northwest Tucson area (see species distribution section above). Survey results for 1996 found 16 CFPOs in this area, including one pair and two fledged young. Survey results in 1997 located nine CFPOs, including one pair and four fledged young. In 1998, researchers found three nests which successfully raised 11 juveniles documented in this area alone, which is at least twice the number of young previously documented in any prior year. The area supporting these owls is located immediately adjacent to the Coronado National Forest - Santa Catalina EMA. In July 1998, a CFPO was heard in the Rincon Allotment of the Santa Catalina EMA during a survey conducted by the Forest Service (unpubl. data). In addition, an unconfirmed report of a CFPO was also documented in the same general area the prior month (Forest Service unpubl. data 1998). In 1999, four pairs of CFPOs have been documented nesting as were three territorial single males in the Tucson/Marana area (S. Richardson, AGFD, pers. comm. 1999).

Recently, several new CFPO sites have also been documented in the Altar Valley in southern Arizona which is adjacent to the Tumacacori EMA. As of late June 1999, 15 active sites and one additional site active the prior year but not active in 1999, totaling at least 19 adult CFPOs were documented in this region. CFPOs from at least four of these sites had nesting confirmed in 1999. These sites are all located in mesquite lined washes within semidesert grasslands or in xeroriparian woodlands. These new sites have been found as a result of a considerably increased survey effort over the past two years in this region.

CFPOs have been documented in the riparian deciduous woodland habitats in the Tumacacori EMA and along Sonoita Creek which flows between the Huachuca and Santa Rita EMAs. Two new sites were also found in 1998 on the BANWR in riparian habitats, one of which was confirmed again in 1999 are interconnected to the Tumacacori EMA where unsurveyed habitat may be present. In 1999, one of these owl pairs may have relocated upstream from its previous year's location to within approximately one mile of the Jarillas Allotment in the EMA (S. Richardson, AGFD, pers. comm. 1999). The other 1998 site in BANWR was not active in 1999.

While there have been few recent reports of CFPOs on the Coronado National Forest, the many records provided above indicate that CFPOs were at one time found at least in small numbers throughout the geographic area encompassed by the proposed action. The Forest Service (1998c) reports that surveys were initiated on the National Forest in 1994, and as of September 1998, approximately 6,160 ha (15,400 ac) have been surveyed. The Forest Service conducted surveys over about 1,200 (3,000 ac) additional hectares within the Santa Catalina, Santa Rita, and Tumacacori EMAs in 1999, however, a survey summary of all areas surveyed was not available from the Forest Service. A nesting CFPO pair was documented next to the National Forest within 1.6 km (1 mi) of the Jarillas Allotment in the Tumacacori EMA in 1999 and CFPOs have also been heard on the Rincon Allotment in the Catalina EMA in 1998. The Forest Service (1998c) has determined there is potentially suitable habitat for CFPOs within three EMAs (Santa Catalina, Santa Rita, and Tumacacori). It is unclear at this time how much of the suitable habitat that may be present on the Forest has actually been surveyed. A list of the areas containing suitable habitat surveyed was not available to the Service for this biological opinion.

The Forest Service in cooperation with AGFD and the Service, has developed a habitat assessment procedure to prioritize areas for surveys that may be suitable habitat. This procedure quantifies the quality of habitat based on what is thought to be important habitat features for CFPOs in Arizona. The Forest Service used the Bureau of Land Management (BLM) assessment methodology as a basis for developing their own assessment key modified to vegetation and habitat conditions unique to the Coronado National Forest. The Forest Service is using this assessment rating key to quantify important CFPO habitat features found on the Forest. A factored score of 26 out of a possible 40 is the threshold to identify potentially suitable habitat and prioritize areas for surveys. Areas with the potential of containing suitable CFPO habitat that are below 1,280 m (4,200 ft) in elevation have been identified by the Forest Service to be assessed. As of June, 1999, assessments and surveys have been completed in portions of the Santa Catalina, Santa Rita, and Tumacacori EMAs. It is not clear, based to the information provided the Service by the Forest Service whether all areas that may contain potentially suitable CFPO habitat have been assessed at this time. The Forest submitted to the Service a list of sites within allotments that have had assessments with potentially suitable habitat within three EMAs (factored scores above 26).

Santa Catalina EMA

Allotment	CFPO surveys conducted?
Samaniego	unknown
Redington Pass	unknown
Bellota	unknown
Rincon/Agua Verde	unknown
Last Chance	unknown
Cumero	unknown
Happy Valley	unknown

Tumacacori EMA

Allotment	CFPO surveys conducted?
Jarillas	unknown
Sardina	unknown
Rock Coral	unknown
Sopori	unknown
Pena Blanca	unknown
Fresnal	unknown
Montana	unknown
Calabasas & Ramanote	unknown
Murphy	unknown

Santa Rita EMA

Allotment	CFPO surveys conducted?
Proctor	unknown

In December 1998, the first Habitat Conservation Plan (HCP) and section 10(a)(1)(B) permit for the CFPO was approved for a guest ranch which may ultimately be converted to a low density residential housing development located in northwest Tucson. Pima County is currently working with the Service on developing a county-wide Sonoran Desert Conservation Plan (SDCP) which, if approved, would issue the county a section 10 permit for not only CFPOs but also potentially 17 other listed species and 5 candidate species. No habitat restoration projects specific to the CFPO exist for lands managed by the U.S. Government, Indian Nations, State agencies, or private parties. The Forest Service, BLM, and Bureau of Reclamation have focused attention in some areas on modifying livestock grazing practices in recent years, particularly as they affect riparian ecosystems. Several of these projects are within the currently known range of CFPOs, including historical locations.

Effects of the Action

Of the 12 EMAs on the Coronado National Forest, the Forest Service has concluded that, based their habitat assessment, three EMAs have potentially suitable CFPO habitat. The Forest Service has initiated habitat assessments to prioritize their survey efforts and has identified seven allotments in the Santa Catalina EMA, ten allotments in Tumacacori EMA, and one allotment in the Santa Rita EMA that had factored scores above 26 (see discussion above). It is unclear at this time if all of the areas that may contain potentially suitable habitat for the CFPO on the Forest have been assessed and if those areas with scores above 26 have had surveyes completed.

Appendix A of the Biological Assessment (USFS 1998c) summarizes the effects analysis for allotments with an effect determination for each of the activities being analyzed under the grazing program for this project (permitted use, grazing system, utilization, and range improvements). The Forest Service (1998c) assessed effects to species in allotments in the short-term and long-term. The Service considers effects in the short-term and long-term to be the same for the CFPO in this consultation which is reflected in the guidance criteria developed by both the Forest Service and the Service.

Within the 16 allotments in the Tumacacori EMA, the Forest Service (1998c) determined that 14 allotments (Calabasas, Carrizo, Cross S, Fresnal, Jarillas, Mariposa, Marstellar, Murphy, Oro Blanco, Pena Blanca, Ramanote, Rock Coral, Sardina, and Sopori) are likely to adversely affect the CFPO in the short-term and 8 allotments in the long-term because: 1) livestock grazing is authorized in what is believed to be unsurveyed suitable habitat; 2) allowable use levels are in excess of 30 percent; and 3) livestock gathering activities occur in what is thought to be unsurveyed suitable habitat between January 1 and June 30.

New information gathered since the Forest's Biological Assessment (1998c) shows a new CFPO nest site has been found within 1.6 km (1 mi) of the Jarillas Allotment in the Tumacacori EMA.

However, considering this new information, the Forest has indicated that no changes in utilization levels or livestock gathering activities will be made in this allotment because of this new owl site which is immediately next to this allotment (T. Skinner, pers. comm., 1999).

The Santa Catalina EMA contains 11 allotments with land below 1,212 m (4,000 ft). The Forest Service determined that two allotments (Samaniego Ridge, Bellota) are likely to adversely affect the CFPO in the short-term and one allotment (Redington Pass) in the long-term because: 1) livestock grazing is authorized in what is believed to be unsurveyed suitable habitat; 2) allowable use levels are in excess of 30 percent; and 3) livestock gathering activities occur in what is thought to be unsurveyed suitable habitat between January 1 and June 30. The Forest Service (1998c) concluded that grazing activities in five allotments may affect, but are not likely to adversely affect the CFPO because of poor habitat quality or very little suitable habitat is present, although habitat assessments have not be conducted in these areas.

Habitat assessments initiated in 1999 within this EMA have identified potentially suitable habitats with a factored score of above 26 in the Happy Valley and Cumero Allotments. The Forest previously believed both allotments to be of poor CFPO quality or were too small. It is unclear whether all of the areas containing potentially suitable habitat within these allotments or the EMA have been assessed at this time, and as a result, more suitable habitat may be present. The Forest Service (1998c) made a not likely to adversely affect determination for these allotments. In light of this new information, and because it is unclear whether all of the areas have been assessed, or those areas with a factored score of 26 or higher have been surveyed for CFPOs, the Service does not concur with this not likely to adversely affect determination in this EMA. If the Forest Service provides documentation to the Service that all areas within this EMA having the potential of being suitable CFPO habitat have been assessed, and those areas with a factored score of 26 or higher have been surveyed with no CFPOs found, then the Service would concur with the Forest’s not likely to adversely affect determination in these allotments.

In the Santa Rita EMA, five allotments (Agua Caliente, McBeth, Proctor, Squaw Gulch, and Stone Springs) have land below 1,212 m (4,000 ft). Preliminary site visits showed poor nesting habitat, and thus the Forest Service considered these allotments unlikely to contain suitable CFPO habitat. Therefore, the Forest Service determined that livestock grazing activities may affect, but are not likely to adversely affect the CFPO in all five allotments. Since the 1998 BA, the Forest has initiated habitat assessments within this EMA and has found portions of at least one allotment (Proctor) with a factored score of 28 or higher. It is unclear if surveys have been completed in these areas. In light of this new information, and because it is unclear whether all areas having the potential of suitable habitat have been assessed by the Forest Service, and it is unknown whether all of those areas that have had assessments or those areas with a factored score of 26 or higher have been surveyed for CFPOs, the Service does not concur with this not likely to adversely affect determination in this EMA. If the Forest Service provides documentation to the Service that all areas within this EMA having the potential of being suitable CFPO habitat have been assessed, and those areas with a factored score of 26 or higher have been surveyed with no CFPOs found, then the Service would concur with the Forest’s not likely to adversely affect determination in these allotments.

As noted above in the section entitled ENVIRONMENTAL BASELINE, the loss of riparian habitat to a variety of uses, including livestock overgrazing, is considered one of the causes contributing to the decline of the CFPO. Ohmart and Anderson (1986) note that structural complexity and mean canopy height of riparian forests are generally reduced where riparian systems are under heavy water management, livestock grazing, pollution, or recreational activities. Arizona Department of Environmental Quality (1993) notes that changes to plant community structure and age class structure occur by direct consumption of plants and by disturbances to soils. Because the most palatable plants are eaten first, remaining plants have a competitive advantage and become more widespread. Young, palatable plants of all species are consumed before they can mature and set seed. Furthermore, disturbance of soils may prevent establishment of seedlings, and can affect the roots of riparian plants with shallow root systems. Chaney et al. (1990) note that depleted upland vegetation can cause livestock to concentrate in riparian areas, causing further riparian losses. Damage to riparian areas from grazing without proper control of intensity, season, and duration can be long-lasting and potentially irreversible.

In semidesert grasslands, Holechek et al. (1998) recommended that utilization average about 35 percent (Holechek 1999). For semidesert grass/shrub rangelands, Martin (1975) recommended that average utilization rates should be about 40 percent, but may range as high as 60 percent in dry years to as low as 20 percent in high production years. To affect an improvement in degraded range condition, lower utilization rates should be applied (Martin 1973, Holechek et al. 1998). The maximum utilization rates authorized by the Coronado National Forest in key areas may not reflect average utilization over space and time within allotments. However, because they are higher than averages recommended by Holechek and Martin, the potential exists under permitted grazing to average more than 40 percent utilization, which may be more than the rangeland can sustain without degradation.

Stromberg (1993a & b) notes that unregulated livestock grazing has been implicated as one of the primary causes of decadent age structures of trees, where stands have large, old trees, but few saplings or small trees. Additionally, Stromberg (1993a & b) notes that reduced seedling establishment can result from browsing, trampling of seeds, and reduction of a stabilizing herbaceous cover. Soil compaction associated with grazing can reduce the growth rate of existing trees by decreasing water percolation and the abundance of mycorrhizae and other critical soil components. Additional information on the effects of livestock grazing in riparian communities is found in the EFFECTS OF THE PROPOSED ACTION for the Huachuca water umbel, Gila topminnow, and the ENVIRONMENTAL BASELINE (Forest-wide) Section.

Grazing in the watersheds of riparian communities may also affect riparian vegetation communities, stream hydrology, and channel morphology. In particular, degraded watersheds can result in higher peak flows, lower base flows, erosion and sedimentation of stream channels, and other effects, which are described in detail in the EFFECTS OF THE PROPOSED ACTION for the Huachuca water umbel and Gila topminnow.

In riparian areas and Sonoran desertscrub communities, the Forest Service indicates that grazing levels have been set for minimal effects to the range and are not expected to result in take of the

CFPO. The Forest Service notes that 32 allotments contain riparian habitat or Sonoran desertscrub communities with potential habitat for the CFPO. All of these are currently in some rotation type grazing systems. None of these allotments have year-long grazing.

Plant species found within Sonoran desertscrub occupied by CFPOs include saguaro cacti, blue palo verde, ironwood, acacia, prickly pear, and cholla, with dense patches of triangle-leaf bursage, and other herbaceous species in the understory. A study conducted on the Sierra Ancha grazing allotment of the Tonto National Forest near Roosevelt Lake indicated that cattle diets were mainly annual grasses and forbs for March, April, and early May, and that shrubs made up only three to 10 percent of the diet in these months. However, in May, as annuals begin to dry up and jojoba (*Simmondsia chinensis)* and mesquite start to grow, livestock begin browsing more heavily on these species. Jojoba made up 53 percent of their diet in late May, declining to 13 percent in October. Mesquite ranged from 15 to 40 percent of their diet from June through October (Smith et al. 1993a).

Smith et al. (1993b) conducted an additional study on the Santa Rita Experimental Range south of Tucson, Arizona. Their study determined that grasses comprised approximately 55 percent of the year-round diet, reaching a peak of 78 percent in the summer and a low of 35 percent in early spring. Forbs were found to comprise minor percentages of the diet except in early spring when borages made up approximately 33 percent of the diet. Shrubs made up approximately 33 percent of the diet year-long, peaking at 55 percent in winter and 45 percent in spring. Smith et al. (1993b) note that *Opuntia* spp. and mesquite were the major shrub components. The study also noted that utilization levels were 40 to 50 percent, so that selected forage was not influenced by a shortage of specific species due to overgrazing.

The United States General Accounting Office (GAO) (1991) determined that "...domestic livestock grazing on the BLM's hot desert allotments continues to impose the risk of long-term environmental damage to a highly fragile resource." The GAO states that historic grazing practices reduced the productivity and vigor of the hot desert ecosystems, and believes that evidence suggested that grazing practices continued to reduce productivity and vigor, noting that recovery could take decades in some areas, and that damage may be irreversible in others. The GAO notes that there continues to be evidence that, while grazing practices have changed substantially, current grazing practices continue to degrade some lands. Among the effects of grazing noted by the GAO are trampling of vegetation, removal of vegetation, trampling of habitat for endangered species, elimination of vegetation components, and grazing too heavily on key species. The GAO indicates that "Furthermore, changes in the amount and composition of vegetation caused by overgrazing can be detrimental to native wildlife that are unable to adapt to the alterations." The GAO report additionally notes that a study conducted by the BLM between 1978 and 1989 indicates that, if livestock grazing were discontinued, recovery would begin. Specifically, the GAO indicates that less soil erosion would occur, water infiltration would increase, soils would generally improve, vegetation would gain in health and vigor, cover would increase and would benefit both soil and wildlife.

Near one of the highest known concentrations of CFPO in northwestern Tucson and Marana are portions of three allotments, including Redington Pass, Bellota, and Samaniego Ridge. Although portions of these allotments are on the northern side of the Santa Catalina Mountains, they are geographically close to northwestern Tucson, and it is possible that CFPOs could reach these areas while staying below 1,212 m (4,000 ft). A fourth allotment, Rincon/Agua Verde where the CFPO was detected in 1998 is also near this concentration; however, the Forest Service's mitigation measures will limit utilization to 30 percent and limit livestock gathering activities within the nesting season- see Mitigation Section. The Forest Service (1998c) estimates that more than 2,000 ha (5,000 ac) of habitat below 1,212 m (4,000 ft) in elevation may be present within these three allotments. Range conditions are moderately-low in 45 percent of the Bellota, low in 20 percent of the Samaniego Ridge, and moderately-low in 15 percent of the Redington Pass allotments. This suggests that these allotments have been already adversely affected to some degree by past or current livestock grazing, although other factors such as long-term drought and proliferation of nonnative plants may have played a role in range condition. However, nonnative perennial plants are less of a factor in Sonoran desertscrub than in desert grasslands, and Sonoran desert shrubs, trees, and cacti are adapted to surviving short-term drought. The Service is concerned about the potential adverse effects to CFPOs in these allotments which are all in various degrees degraded, particularly since they contain unsurveyed potential habitat near one of the highest known concentration of CFPOs in Arizona (northwest Tucson area).

The Tumacacori EMA is in relative close proximity to the high concentration of recently documented CFPO sites. In particular, the Jarillas (which has an active site within 1.6 km [1 mi]), Carrizo, Oro Blanco, Sardina, and Sopori are geographically close and may be linked by drainages or suitable habitats with known owls. The Forest Service (1998c) has determined that 45 percent of the Murphy allotment in the Tumacacori EMA is in moderately-low range condition. The Service is also particularly concerned that grazing activities will continue to maintain or worsen these degraded conditions within unsurveyed potential suitable CFPO habitat.

In Sonoran desertscrub, CFPOs are typically found in very well-developed thickets of desert vegetation and within xeroriparian habitats they appear to select relatively dense drainages lined with trees and shrubs. Grazing that reduces the structure and composition of desertscrub and xeroriparian communities below the site's potential likely adversely affect the suitability of the site as CFPO habitat. Although grazing in semidesert grassland and Chihuahuan desertscrub can cause a decrease in grasses and an increase in shrubby species (Holechek et al. 1994, Bahre 1995), this effect has not been documented in Sonoran desertscrub. Grazing can result in reduced shrub cover (Webb and Stielstra 1979) and reduced desirable shrubs (Orodho et al. 1990) in Mojave desertscrub and Great Basin desertscrub, respectively. Browsing of shrubs and young trees, trampling or browsing of saguaros and their nurse plants (Abouhalder 1992), and adverse effects to soils and cryptobiotic crusts are mechanisms by which the structure and composition of Sonoran desertscrub could be affected by grazing. Reduction in shrub, tree, and columnar cactus cover and regeneration would degrade CFPO habitat.

Changes to the structure and composition of xeroriparian and Sonoran desertscrub communities and riparian habitats can result in a decreased prey base for the CFPO, increased susceptibility of the CFPO to its aerial predators, reduction in suitable nesting structures, and habitat fragmentation. The Service is particularly concerned with year-long grazing in riparian and Sonoran desertscrub habitat. The Service believes that this type of grazing can, in the long-term, decrease potential nesting habitat for the CFPO by suppressing regeneration of trees in riparian areas and by inhibiting recruitment of saguaros.

Construction of range improvements, prescribed fire, planting or seeding of nonnative plants, and chemical or mechanical vegetation management could result in direct effects to CFPOs. Construction of a pipeline, stock tank, or other improvement could disturb CFPOs or result in destruction of nesting or foraging habitat. Prescribed fire in uplands could spread to and destroy riparian habitat occupied or potentially occupied by CFPOs. Seeding or planting of nonnative plants could increase the chances of catastrophic fire that destroys nest sites and foraging habitat, particularly in semidesert grassland and Sonoran desertscrub. Chemical or mechanical vegetation management, which often targets reduction of shrubby species, could degrade CFPO habitat.

Livestock gathering activities which concentrate cattle or human activities at corrals, loading/unloading facilities, etc. may impact nesting CFPOs if they are nesting near these areas during the nesting season (January 1 - June 30). Such activities may disturb nesting owls, causing them to not nest in a particular area, or abandon active nests, particularly during the period the female is incubating eggs. The Service is concerned that adverse impacts from such activities may occur to nesting CFPOs if they take place within 400 m (0.25 mi) of unsurveyed habitat or a known owl site. If all suitable habitat within 400 m (0.25 mi) of a grazing gathering activity is assessed and those with a factored score 26 or higher are surveyed with no CFPOs found, then the potential of adverse impacts from disturbance would be reduced. More research needs to be completed as to the effect of disturbance has on CFPOs.

The proposed project area encompasses a large portion of the historic range of this species, and includes areas historically occupied by CFPOs. The Forest Service has indicated that allotments in the project area encompass potential habitat for this species; however, surveys completed to date have been limited and it is not possible to ascertain occupancy on the Forest. The Service believes there is a potential for CFPOs to occur in some of the Forest Service's allotments and that they could be adversely affected by the proposed action when grazing and associated activities exceed levels within the guidance criteria as stated on Page III-38 of the BA (USFS 1998c). Loss of vegetation essential for foraging and cover from aerial predators, as well as the potential decrease in nesting cavities due to the loss of saguaros and browsing on mesquite, and suppression of riparian tree regeneration, as documented by the Forest Service (1998c), could adversely affect this species in those allotments exceeding guidance criteria levels.

The Forest Service has proposed measures to reduce or eliminate both direct and indirect impacts from livestock grazing on the CFPO and its habitat on the Santa Catalina EMA (Rincon/Agua Verde allotment) where a CFPO was heard in 1998. Utilization levels will be limited to 30 percent in this allotment and gathering activities will be restricted within 400 m (0.25 mi) of an occupied site from January 1 through June 30. Grazing has also been excluded in the Catalina Foothills region of the Santa Catalina EMA near a large concentration of CFPOs in northwest

Tucson/Marana area, and also in the southern portion of the Tumacacori EMA near the U.S. - Mexican border where CFPOs have been previously documented. The Service believes these measures carried out in these allotments to be effective mitigation which, based on the current literature, will maintain vegetative conditions that would be conducive to the needs of CFPOs. No areas within the Coronado National Forest have been designated as critical habitat for the CFPO (USFWS 1999a), therefore, no effects are anticipated to critical habitat.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline. Due to the extent of the lands in the project area administered by Federal agencies, particularly the Forest Service and the BLM, many of the actions that are reasonably expected to occur in the general area would be subject to section 7 consultations. However, many activities are expected to occur on private and State lands that are not subject to the section 7 process.

Development of non-Federal lands in the northwest Tucson and Marana area is ongoing and presents a significant threat to one of the highest known concentrations of CFPOs in Arizona. Other activities expected to occur on non-Federal lands in potential CFPO habitat include agricultural uses, continued grazing on private and State lands, and woodcutting. Large-scale habitat fragmentation and loss of CFPO habitat near the Coronado National Forest is expected to continue into the next century and will further impact the owl. Lower elevation areas (below 1,200 m [4,200 ft]) within the National Forest may be increasingly important habitat and may provide linkages and connectivity as adjacent areas are developed. State lands and other areas that are currently suitable habitat may be also sold or developed, further impacting this species. In addition, recreational activities will undoubtably increase as more people move into the area and as the population of the region increases, this will further impact the CFPO.

Cumulative effects for potential habitat areas on riparian areas are described in the topminnow and Huachuca water umbel discussions.

The Service believes the effects described above are not likely to jeopardize the continued existence of the CFPO. We present this conclusion for the following reasons:

1. The Forest Service's project description includes features and options to mitigate the direct and indirect impacts of the proposed action on occupied CFPO habitat.

2. The direct and indirect effects of grazing will be minimized in areas known to be occupied by CFPOs.

Conclusion

Due to recently completed habitat assessments within the Santa Catalina EMA, potentially suitable habitat has been identified in the Happy Valley and Cumero Allotments. The Forest Service (1998c) originally made a not likely to adversely affect determination for these allotments. In light of this new information, and because it is unclear whether these areas have been surveyed for CFPOs, the Service does not concur with this determination of effects. Therefore, the Service believes that, until surveys have been completed with no CFPOs found, this action may affect, and is likely to adversely affect the CFPO. If after assessments and surveys are completed in all areas with a factored score of 26 or higher and no CFPOs are found, then the Service would concur that grazing activities in those allotments would not adversely affect this species.

The Service does not concur with the Forest Service's determination of may affect, but not likely to adversely affect in the five allotments in the Santa Rita EMA and six allotments in the Santa Catalina EMA for the following reasons: 1) the allotments below 1,212 m (4,000 ft) which may contain suitable CFPO habitat, however, it is unclear whether a complete habitat assessment has been completed within potentially suitable habitat in the EMA. Therefore, the Service believes that, until it is determined whether habitat assessments have been completed, grazing activities occurring below 1,212 m (4,000 ft) in potential habitat may affect, and are likely to adversely affect this species. If, after habitat assessments have been completed in areas containing potential suitable habitat, and surveys have been completed in areas with a factored score of 26 or higher with no CFPOs found, then the Service would concur that grazing activities in those allotments would not adversely affect this species.

With the recent sighting of a nesting CFPO near the Jarillas Allotment, adverse impacts from grazing and gathering activities may occur in suitable habitat to CFPOs that may be present or may move onto this allotment. There is a potential of dispersing owls moving onto this allotment from this nearby nest or other nest sites. The Forest (1998c) made a determination of may affect, likely to adversely affect the CFPO. This determination was made prior to the CFPO that was documented within 1.6 km (1 mi) of the allotment. However, the Forest Service has not changed its effect determination in light of this new information. It is unknown at this time if all the suitable habitat within this allotment has been surveyed. Regardless, the Service believes there is a high likelihood that if suitable habitat is present in the allotment, especially if it is connected with this recent sighting, owls may be present or may move onto the Forest. Even if this area is currently unoccupied, it may be important for future nesting territories and may assist in recovery of the species. Grazing utilization levels in this allotment have been set at 35 percent during the growing season, and 45 percent in the dormant season, which is above levels recommended by Martin 1973, Holechek et al. 1998, and Holechek 1999, for rangelands.

After reviewing the current status of the CFPO, the environmental baseline for the action area, and the anticipated effects of the proposed action, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the CFPO. No critical habitat has been designated for this species within the project area, thus none will be adversely modified.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement. The Service does not anticipate the proposed action will result in incidental take of the cactus ferruginous pygmy-owl.

Recent, comprehensive survey data documenting presence or absence of the CFPO is lacking for the allotments addressed in this consultation. As a result, the Service can not reasonably conclude that incidental take is likely to occur as a result of the proposed action and, therefore, no terms and conditions or reasonable and prudent measures are provided for the CFPO. As part of the proposed action in the Forest Plan consultation (December 19, 1997, biological opinion), the Forest committed to conducting surveys for CFPOs on at least 2,000 ha (5,000 ac) of the Coronado per year. If a CFPO is located in an allotment or nearby during these or other surveys, and that owl may be adversely affected by the proposed action, then reinitiation of consultation is warranted [50 CFR 402.16(b)]. The Service would reevaluate the need for an incidental take statement at that time.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the cactus ferruginous pygmy-owl. In furtherance of the purposes of the Act, we recommend implementing the following discretionary actions:

1. The Coronado National Forest should adopt average utilization rates of 35 to 40 percent for areas rated at 26 or above as potential CFPO habitat to maintain or improve range condition and vegetation communities in the long-term. Areas of allotments with unsatisfactory soil conditions, moderately low or low range condition, and areas with downward trends in range condition should be especially targeted for reduced utilization rates. These rates should also be used within all allotments containing potentially suitable CFPO habitat or areas which have not been assessed but might be potentially suitable habitat until an assessment is completed. This utilization standard should be used until further research or literature review reveals that a different level is appropriate to maintain or improve CFPO habitat conditions (food, cover, breeding, and space for population growth and normal behavior) or its development in the future and lead to actions to conserve endangered and threatened species as required under the Act. Of particular concern to the Service are those allotments that are currently in various levels of degraded condition (Samaniego Ridge, Bellota, Redington Pass, and Murphy) where grazing will continue at levels up to 55 percent utilization.

2. Limit livestock gathering activities that concentrate livestock or humans within 400 m (0.25 mi) of any occupied site or unsurveyed suitable habitat during the breeding season (between January 1 and June 30).

3. The Forest Service, in cooperation with the Service, BLM, AGFD, and others, should meet annually to revise as appropriate the Forest's CFPO habitat assessment methodology as new information is gathered and analyzed. Focus should be on vegetative communities found on the Coronado National Forest in all potentially suitable CFPO where grazing and associated activities might take place. Range site guides from the Natural Resource Conservation Service may be useful in this assessment.

4. The Forest Service should conduct surveys in all suitable CFPO habitat on the Forest where grazing activities will take place. All surveys should be conducted using the protocol recommended by the Service at the time surveys are to be conducted. If a CFPO is found, the Forest Service must reinitiate consultation with the Service to address potential adverse effects.

5. Encourage private landowners with riparian communities on their property to seek assistance in removing cattle from riparian areas or taking other riparian restoration measures through the Service's Partners for Wildlife Program.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species, the Service requests notification of implementation of any conservation actions.

(Note: surveys involving simulated or recorded calls of cactus ferruginous pygmy-owls require an appropriate permit from the Service. Arizona Game and Fish Department should also be contacted in regard to State permitting requirements.)

MEXICAN SPOTTED OWL (*Strix occidentalis lucida*)

The Service does not concur with the not likely to adversely affect determinations for the Lone Mountain/Parker Canyon and Mescal allotments. The Forest requested that any non-concurrences be included in formal consultation.

Status of the Species

The Mexican spotted owl was listed as threatened on March 16, 1993 (USFWS 1993a). Critical habitat was designated for the species on June 6, 1995 (USFWS 1995b), but was withdrawn in a recent Federal Register notice (USFWS 1998a). The Mexican spotted owl was originally described from a specimen collected at Mount Tancitaro, Michoacan, Mexico, and named *Syrnium occidentale lucidum*. The spotted owl was later assigned to the genus *Strix*. Specific and subspecific names were changed to conform to taxonomic standards and the subspecies became *S. o. lucida*. The American Ornithologists' Union currently recognizes three spotted owl subspecies, including the California, *S. o. occidentalis*; Mexican, *S. o. lucida*; and Northern, *S. o. caurina*. The Mexican spotted owl is mottled in appearance with irregular white and brown spots on its abdomen, back, and head. The spots of the Mexican spotted owl are larger and more numerous than in the other two subspecies giving it a lighter appearance. Several thin white bands mark an otherwise brown tail. Unlike most owls, spotted owls have dark eyes.

Geographic distribution and plumage distinguish the Mexican spotted owl from the California and northern subspecies chiefly. The Mexican spotted owl has the largest geographic range of the three subspecies. The range extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona and New Mexico and, discontinuously through the Sierra Madre Occidental and Oriental to the mountains at the southern end of the Mexican Plateau. There are no estimates of the owl's historic population size. Its historic range and present distribution are thought to be similar. Using starch-gel electrophoresis to examine genetic variability among the three subspecies of spotted owls, Barrowclough and Gutierrez (1990) found the Mexican spotted owl to be significantly distinguishable from the other two subspecies, which suggests prolonged geographic isolation of the Mexican subspecies and suggests that the Mexican spotted owl may represent a species distinct from the California and Northern spotted owls.

The current known range of the Mexican spotted owl extends north from Aguascalientes, Mexico through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah and southwestern Colorado, and the Front Range of central Colorado. Although this range covers a broad area of the southwestern United States and Mexico, much remains unknown about the species' distribution within this range. This is especially true in Mexico where much of the owl's range has not been surveyed. Information gaps also appear for the species' distribution within the United States. The owl apparently occupies a fragmented distribution throughout its United States range corresponding to the availability of forested mountains and canyons, and sometimes, rocky canyon lands.

The primary administrator of lands supporting owls in the United States is the Forest Service. According to the Mexican Spotted Owl Recovery Plan (USFWS 1995a), 91 percent of owls known to exist in the United States between 1990 and 1993 occur on land administered by the Forest Service. The majority of owls have been found within Region 3 of the Forest Service, which includes 11 National Forests in New Mexico and Arizona. Forest Service Regions 2 and 4, including two national forests in Colorado and three in Utah, support fewer owls.

A reliable estimate of the numbers of owls throughout its range is not currently available due to limited information. Owl surveys conducted from 1990 through 1993 indicate that the species persists in most locations reported before 1989, except for riparian habitats in the lowlands of Arizona and New Mexico, and all previously occupied areas in the southern states of Mexico. Increased survey efforts have resulted in additional sightings for all recovery units. Fletcher (1990) calculated that 2,074 owls existed in Arizona and New Mexico in 1990 using information gathered by Region 3 of the Forest Service. Fletcher's calculations were modified by the Service (USFWS 1991), who estimated that there was a total of 2,160 owls in the United States. While the number of owls throughout its range is currently not available, the Recovery Plan reports an estimate of owl sites based on 1990 - 1993 data. An owl "site" is defined as “a visual sighting of at least one adult owl or a minimum of two auditory detections in the same vicinity in the same year.” Surveys from 1990 through 1993 indicate one or more owls have been observed at a minimum of 758 sites in the United States and 19 sites in Mexico. Total known numbers as of 1993 in the United States range from 758 individuals, assuming a single owl occupied each known site, to 1,518 individuals, assuming a pair of owls occupied each known site. This may not include all newly fledged young, dispersing birds, floaters, or other non-territorial birds.

Past, current, and future timber-harvest practices in Region 3 of the Forest Service, in addition to catastrophic wildfire, were cited as the primary factors leading to listing of the spotted owl as a threatened species. Fletcher (1990) estimates that 419,985 ha (1,037,000 ac) of habitat were converted from suitable (providing all requirements of the owl, e.g., nesting, roosting, and foraging) to capable (once suitable, but no longer so). Of this, about 78.7 percent, or 330,480 ha (816,000 ac), was a result of human management activities, whereas the remainder was converted more or less naturally, primarily by wildfire. Other factors which have or may lead to the decline of this species include a lack of adequate regulatory mechanisms.

Mexican spotted owls breed sporadically and do not nest every year. Mexican spotted owl reproductive chronology varies somewhat across the range of the owl. In Arizona, courtship apparently begins in March with pairs roosting together during the day and calling to each other at dusk (Ganey 1988). Eggs are laid in late March or, more typically, early April. Incubation begins shortly after the first egg is laid, and is done entirely by the female (Ganey 1988). The incubation period for the Mexican spotted owl is assumed to be 30 days (Ganey 1988). During incubation and the first half of the brooding period, the female leaves the nest only to defecate, regurgitate pellets, or to receive prey from the male, who does all or most of the foraging (Forsman et al. 1984, Ganey 1988). Eggs usually hatch in early May, with nestling owls fledging four to five weeks later, and then dispersing in mid September to early October (Ganey 1988).

Little is known about the reproductive output for the spotted owl. It varies both spatially and temporally (White et al. 1995), but the subspecies demonstrates an average annual rate of 1.001 young per pair. There is inadequate data at this time to estimate population trends. Little confidence in initial estimates has been expressed, and is due to its reliance on juvenile survival rates which are believed to be biased low, and due to the insufficient time over which studies have been conducted.

Based on short-term population and radio-tracking studies, and longer-term monitoring studies, the probability of an adult Mexican spotted owl surviving from one year to the next is 0.8 to 0.9. Juvenile survival is much lower at 0.06 to 0.29, although it is believed these estimates may be artificially low due to the high likelihood of permanent dispersal from the study area and the lag of several years before marked juveniles reappear as territory holders and are detected as survivors through recapture efforts (White et al. 1995). Little research has been conducted on the causes of mortality of the spotted owl, but predation by great horned owls (*Bubo virginianus)*, northern goshawks (*Accipiter gentilis)*, red-tailed hawks (*Buteo jamaicensis)*, and golden eagles (*Aquila chrysaetos)*; starvation; and accidents or collisions may all be factors.

Mexican spotted owls nest, roost, forage, and disperse in a diverse array of biotic communities. Nesting habitat is typically in areas with complex forest structure or rocky canyons, and contains mature or old-growth stands which are uneven-aged, multistoried, and have high canopy closure (Ganey and Balda 1989, USFWS 1991). In the northern portion of the range (southern Utah and Colorado), most nests are in caves or on cliff ledges in steep-walled canyons. Elsewhere, the majority of nests are in Douglas-fir trees (*Pseudotsuga menziesii)*(Fletcher and Hollis 1994, Seamans and Gutierrez 1995). A wider variety of tree species is used for roosting; however, Douglas-fir is the most commonly used species (Ganey 1988, Fletcher and Hollis 1994). Foraging owls use a wider variety of forest conditions than for nesting or roosting. In northern Arizona, owls generally foraged slightly more than expected in unlogged forests, and less so in selectively logged forests (Ganey and Balda 1994). However, patterns of habitat use varied between study areas and individual birds, making generalizations difficult.

Seasonal movement patterns of Mexican spotted owls are variable. Some individuals are year-round residents within an area, some remain in the same general area but show shifts in habitat-use patterns, and some migrate considerable distances 20 to 50 km (12-31 mi) during the winter, generally migrating to more open habitats at lower elevations (Ganey and Balda 1989, Willey 1993, Ganey et al. 1998a, b). Home-range size of Mexican spotted owls appears to vary considerably between habitats and geographic areas (USFWS 1995a), ranging in size from 261 to 1,487 ha (645-3,674 ac) for individual birds, and 381 to 1,551 ha (941-3,833 ac) for pairs (Ganey and Balda 1989). Little is known about habitat use by juveniles during natal dispersal. Ganey et al. (1998a, b) found dispersing juveniles in a variety of habitats ranging from high-elevation forests to pinyon-juniper woodlands and riparian areas surrounded by desert grasslands. Some juveniles remained in forests similar to typical owl breeding habitat.

Mexican spotted owls consume a variety of prey throughout their range but commonly eat small and medium-sized rodents such as woodrats (*Neotoma* spp.), peromyscid mice, and microtine voles. They may also consume bats, birds, reptiles, and arthropods (Ward and Block 1995). Habitats of the owl's common prey emphasize that each prey species uses a unique microhabitat. Deer mice (*Peromyscus maniculatus*) are ubiquitous in distribution in comparison to brush mice (*P. boylei)* which are restricted to drier, rockier substrates. Mexican woodrats (*N. mexicana*) are typically found in areas with considerable shrub or understory tree cover and high log volumes or rocky outcrops. Mexican voles (*Microtus mexicanus*) are associated with high herbaceous cover, primarily grasses; whereas, long-tailed voles (*M. longicaudus*) are found in dense herbaceous cover, primarily forbs, with many shrubs, and limited tree cover. A diverse prey base is dependant on the availability and quality of diverse habitats.

The Mexican Spotted Owl Recovery Plan (USFWS 1995a) provides for three levels of habitat management: Protected areas, restricted areas, and other forest and woodland types. "Protected habitat" includes all known owl sites, and all areas in mixed conifer or pine-oak forests with slopes >40 percent where timber harvest has not occurred in the past 20 years, and all reserved lands. "Protected Activity Centers" (PAC's) are delineated around known or historic Mexican spotted owl sites. A PAC includes a minimum of 243 ha (600 ac) designed to include the best nesting and roosting habitat in the area. This recommended size for a PAC includes, on average from available data, 75 percent of the foraging area of an owl. The management guidelines for protected areas from the recovery plan are to take precedence for activities within protected areas. "Restricted habitat" includes mixed conifer forest, pine-oak forest, and riparian areas; the recovery plan provides less specific management guidelines for these areas. The Recovery Plan provides no owl specific guidelines for "other habitat."

The range of the Mexican spotted owl in the United States has been divided into six recovery units as identified in the Recovery Plan (USFWS 1995a, part II.B.). An additional five recovery units were designated in Mexico. The recovery plan identifies recovery criteria by recovery unit. The Upper Gila Mountain Recovery Unit has the greatest known concentration of owl sites in the United States. This unit is considered a critical nucleus for the owl because of its central location within the owl's range, and presence of more than 50 percent of the known owls. The other recovery units in the United States, listed in decreasing order of known number of owls, are: Basin and Range-East, Basin and Range-West, Colorado Plateau, Southern Rocky Mountain-New Mexico, and Southern Rocky Mountain-Colorado.

From 1991 through 1997, Gutierrez et al. (1997, 1998) studied the demographic characteristics of two Mexican spotted owl populations in the Upper Gila Mountains Recovery Unit. The owl populations studied were on the Coconino and Gila National Forests. Results of this several-year study have shown a decline in the population trend of Mexican spotted owls within these areas. The reason for the reported decline is unknown. According to Gutierrez et al. (1997), such a trend could be a result of: 1) density dependent responses to an increase over carrying capacities; 2) a response to some environmental factor; or 3) senescence. The latter (i.e., senescence) seems unlikely because there was also a negative linear trend in survival estimates for owls less than three years of age. Regarding carrying capacities, responses to density dependence are difficult to prove without removal or addition experiments. Environmental factors undoubtably play a role in owl survival, either through weather events causing direct mortality or indirectly through reduced habitat or prey (Gutierrez et al. 1997). This study found that the ability of adult birds to survive successive years of poor environmental conditions may be low (Gutierrez et al. 1998).

At the end of the 1995 field season, the Forest Service reported a total of 866 management territories (MT's) established in locations where at least a single Mexican spotted owl had been identified (USDA Forest Service, *in litt.* November 9, 1995). The information provided then also included a summary of territories and area of suitable habitat in each Recovery unit. Subsequently, a summary of all territory and monitoring data for the 1995 field season on Forest Service lands was provided to the Service on January 22, 1996. There were minor discrepancies in the number of MT's reported in the November and January data. For the purposes of this analysis we are using the more recent information. Table 17 displays the number of MT's and percentage of the total number of each Forest (USDA Forest Service, *in litt.*, January 22, 1996).

The Forest Service converted some MT's into PAC's following the directions of the Draft Mexican spotted owl Recovery Plan released in March 1995. Project-level consultations with the Service have typically driven the completion of these conversions and varies by National Forest.

The Forest Service has formally consulted on 198 timber sales and other projects in Arizona and New Mexico since August 1993. These projects have resulted in the anticipated incidental take of 115 (plus an unknown number) Mexican spotted owls. In addition, the Bureau of Indian Affairs has consulted on one timber sale on the Navajo Reservation which resulted in an anticipated take of five Mexican spotted owls, and a highway reconstruction which resulted in the anticipated incidental take of two Mexican spotted owls. The Federal Highway Administration has consulted on one highway project that resulted in an undetermined amount of incidental take. The take associated with this action will be determined following further consultation. Additionally, the biological opinion for the Kachina Peaks Wilderness Prescribed Natural Fire (PNF) Plan (#2-21-94-F-220) determined thresholds for incidental take and direct take as follows: 1) one spotted owl or one pair of spotted owl adults and associated eggs and juveniles; 2) harm and harassment of spotted owls in up to two PAC's per year; 3) disturbance to spotted owls and habitat modification of a total of seven PAC's during the life of the Burn Plan related to management ignited fire occurring in PAC's for which the nest site information is three or more years old; 4) harm and harassment of spotted owls and habitat caused by PNF for which adequate surveys have not been conducted, and; 5) harm and harassment of spotted owls and habitat modification of up to one PAC and 200 ha (500 ac) of potential nest or roost habitat caused by wildfire as an indirect result of PNF during the life of the Kachina Burn Plan.

Environmental Baseline in the Action Area

The project area occurs in the Basin and Range-West Recovery Unit (RU). This RU is dominated by Madrean elements in vegetation and climate. It is bounded on its east side by the

Table 17. Number of management territories (MT's) as reported by the Forest Service (USDA Forest Service, *in litt.*, January 22, 1996), percent of MT's as a proportion of the MT's in Forest Service Region 3, and the percent of suitable habitat surveyed in each Forest by National Forest (Fletcher and Hollis 1994).

National Forest	Number of MT's	Percent of MT's	Percent Suitable Habitat Surveyed
Apache-Sitgreaves	122	14.0	99
Carson	3	0.3	62
Cibola	43	5.0	41
Coconino	155	17.8	87
Coronado	**108**	**12.4**	**49**
Gila	197	22.7	50
Kaibab	6	0.7	96
Lincoln	126	14.5	90
Prescott	10	1.2	42
Santa Fe	33	3.8	44
Tonto	66	7.6	55
TOTAL	869	100	

Continental Divide, by the U.S. and Mexico border along the south, by the Colorado River along the west, and by the southern boundary of the Upper Gila Mountain RU along the north. Vegetation ranges from desert scrubland and semidesert grassland in the valleys upwards to montane forests.

Montane vegetation includes interior chaparral, encinal woodlands, and Madrean pine-oak woodlands at low and middle elevations; with ponderosa pine, mixed conifer, and spruce-fir forests at higher elevations (USFWS 1995a). MSO occupies a wide range of habitat types in this RU. Most owls occur in isolated mountain ranges where they inhabit encinal oak woodlands, mixed conifer and pine-oak forests, and rocky canyons. MSO is found primarily on Forest Service lands, with the majority of them on the Coronado National Forest in southeastern Arizona.

Spotted owls in southern Arizona are typically found in Madrean woodlands (Ganey and Balda 1989, Duncan and Taiz 1992). Canyons from 1,130 to 2,290 m (3,700-7,500 ft) are also used by owls (Ganey and Balda 1989). Surveys for Mexican spotted owls on the Forest have covered

46,575 ha (115,000 ac) since 1989. One hundred and seven PAC's have been established in nine of the EMA's. The Dragoon, Peloncillo, and Santa Teresa EMA's have no established PAC's though owl use may still occur.

Effects of the Action

The Recovery Plan specifically identifies overgrazing as a threat to the owl:

> "Overgrazing is suspected to be detrimental in some areas and can affect both habitat structure and the prey base. Effects on the prey base are difficult to quantify, but removal of herbaceous vegetation can reduce both food and cover available to small mammals (Ward and Block 1995). This may be especially true with respect to voles, which are often associated with dense grass cover. Direct effects on habitat are obvious in some places, particularly with respect to browsing on Gambel oak (*Quercus gambeli*). In some areas, oak is regenerating well but unable to grow beyond the sapling stage because of this browsing.... We do not attribute these effects solely to livestock. Forage resources are shared by livestock and wild ungulates" (USFWS 1995a).

Grazing in Mexican spotted owl habitats can affect habitat structure and composition, and also food availability and diversity for the owl. However, predicting the magnitude of grazing effects requires a better understanding of the relationship between owl habitat and grazing. The Recovery Plan (USFWS 1995a) summarizes the effects of grazing to spotted owls in four broad categories: 1) altered prey availability, 2) altered susceptibility to fire, 3) degeneration of riparian plant communities, and 4) impaired ability of plant communities to develop into owl habitat.

Based on existing data on the foraging behavior of Mexican spotted owls, a PAC would include on average only 75 percent of the bird's foraging range. Therefore, prey species abundance and habitat suitability on, and next to a PAC is important in assessing effects to the owl from livestock grazing activities. The lack of data on location of riparian areas and whether or not PAC's are accessible to livestock made analysis of the proposed action very difficult. The Service has focused this effects analysis on the PAC's located within the allotments. Specifically, we have focused on perennial water and meadows and associated riparian areas as these areas are likely to provide the greatest diversity of prey species within PAC's. A map of perennial water provided by the Forest Service was compared to the map of MSO PAC's in the BA. The Service assumed that areas with perennial water hosted riparian vegetation. Many of the PAC's located in the nine EMA's in which MSO are known to exist are considered inaccessible to livestock due to steep topography (November 1998 Biological Assessment). The Forest Service provided maps of PAC's with perennial water sources and mountain meadows (*in litt.* March 12, 1999), although the information has not been verified and intermittent water sources are not shown on the maps. Therefore, the Service's level of confidence in determining potential adverse effects is not high. Given the information provided, it appears that six PAC's located in Lone Mountain Allotment (Huachuca EMA) and the Mescal Allotment (Whetstone EMA) contain riparian areas which are accessible to livestock and for which utilization levels or rangeland conditions do not appear to meet the recommendations of the MSO Recovery Plan (USFWS 1995a).

The effect of livestock and wild ungulate grazing on the habitat of spotted owl prey species is a complex issue. Impacts can vary according to grazing species; degree of use, including numbers of grazers, grazing intensity, grazing frequency, and timing of grazing; habitat type and structure; and plant or prey species composition. Repeated, excessive grazing of plant communities by livestock can significantly alter plant species density, composition, vigor, regeneration, above or below ground phytomass, soil properties, nutrient flow, water quality, and ultimately lead to desertification when uncontrolled (USFWS 1995a).

Prey availability is determined by the distribution, abundance, and diversity of prey and by the owl's ability to capture it. Diet studies conducted on MSOs have shown that prey species of the owl include woodrats, white-footed mice (*Peromyscus* spp.), voles (*Microtus* and *Cleithrionomys* spp.), rabbits and hares (*Sylvilagus* and *Lepus* spp.), pocket gophers (*Thomomys* spp.), other mammals including a variety of bats, birds, insects, and reptiles. Ward and Block (1995) report that rangewide, 90 percent of an "average" MSO diet would contain 30 percent woodrats; 28 percent peromyscid mice; 13 percent arthropods; 9 percent microtine voles; 5 percent birds; and 4 percent medium-sized rodents, mostly diurnal sciurids. These rangewide patterns, however, are not consistent among MSO Recovery Units as data indicate significant differences in owl diets among geographic locations (Ward and Block 1995). Ganey (1992) conducted a MSO prey study between 1984 to 1990 in Arizona and found that woodrats, white-footed mice, and voles accounted for 59 to 88 percent of total biomass. He found that in northern Arizona, MSO ate fewer woodrats and more voles in mesic high elevation forest areas. In mixed conifer habitat of the San Francisco Peaks he found the following percentages of prey biomass in the diet of the owl: 49.1 percent woodrats; 15 percent voles; 12.5 percent peromyscid mice; 9.1 percent pocket gophers; 6.7 percent rabbits; 4.4 percent other medium-sized mammals; 3.1 percent birds; and 0.1 percent arthropods.

Specific studies that document the effects of livestock and wildlife (e.g., elk, deer) grazing on spotted owl habitat have not been conducted. Grazing can alter a plant community through direct alteration such as plant removal by consumption or trampling, and indirectly through the loss of seed source or through damaging the soil. Moderate to heavy grazing can reduce plant diversity, cover, biomass, vigor and regeneration ability (USFWS 1995a). Livestock activity can also increase duff layers, accelerate decomposition of woody material, produce compacted soils, and damage stream banks and channels. These changes to the biotic and physical landscapes also affect plant community composition, structure, and vigor. If these changes occur in or near areas used by spotted owls, then grazing can influence the owl (USFWS 1995a).

Both cattle and wild ungulates affect riparian and meadow environments. These effects have both direct and indirect adverse impacts on animal species that are dependent on plants for food and cover. Within semiarid rangelands, studies indicate that cattle favor riparian areas over upland areas. Riparian areas may provide an important source of food, especially in drier seasons (Trimble and Mendel 1995). However, moderate to light grazing can benefit some plant and animal species under certain conditions and in certain environments, maintain communities in certain seral stages, and may increase primary productivity (Ward and Block 1995).

Livestock can affect small mammals directly by trampling burrows and compacting soil or competing for food, or indirectly by altering the structure or species composition of the vegetation in a way that influences habitat selection by small mammals. Vegetation cover is often greatly reduced on grazed compared with ungrazed areas, and vegetation typically appears more dense in ungrazed areas (Hayward et al. 1997). Bock and Bock (1994) reported that small mammal species that prefer habitats with substantial ground cover were more abundant on an ungrazed site, where species that prefer open habitats were more abundant on a grazed site in southern Arizona.

Prey that positively influences owl survival, reproduction, or numbers may increase the likelihood of persistence of Mexican spotted owl populations (USFWS 1995a). Male owls must provide enough food to their female mates during incubation and brooding to prevent abandonment of nests or young; accordingly, ecologists suspect that spotted owls select habitats partially because of the availability of prey (Ward and Block 1995). In two studies in Arizona and New Mexico, Ward and Block (1995) found that the owl’s food resources are quite variable among vegetation communities through time. In the communities they studied, summer prey biomass arranged in descending order was: Meadows > mixed conifer forests > ponderosa pine/pinyon juniper/oak woodlands > ponderosa pine/Gambel oak forest. Rearranging the same communities according to winter prey biomass indicates: Meadows > ponderosa pine/pinyon juniper/oak woodlands > ponderosa pine/Gambel oak forest > mixed conifer forest. Results of both studies indicate that the owl’s food is most abundant during the summer months when young are being raised. Decreases in prey biomass occur from late fall through the winter. Seasonal decreases like these are typical of small mammal populations. Ward and Block (1995) state that conditions that increase winter food resources will likely improve conditions for the owl because this will increase the likelihood of egg laying and decrease the rate of nest abandonment. Thus, food availability in the winter as well as in the summer is important for owl reproduction.

Some knowledge exists regarding the effects that livestock grazing can have on small mammals frequently consumed by spotted owls, and regarding mesic or montane plant communities inhabited by the owl's prey. Based on studies conducted in other areas of the United States, Ward and Block (1995) indicate that under heavy grazing, decreases in populations of voles would be expected, and this would improve conditions for deer mice in meadow habitat. Deer mice are associated with areas containing little herbaceous cover and extensive exposed soil. Long-tailed and Mexican voles use sites with less exposed ground and greater herbaceous cover. Increases in deer mouse abundance in meadows would not offset decreases in vole numbers because voles provide greater biomass per individual and per unit of area (Ward and Block 1995).

The abundance of small mammals in grazed versus ungrazed areas has also been documented. Hayward et al. (1997) found that total abundance of small mammals differed significantly between grazed and ungrazed plots, with the mean abundance of small mammals per census about 50 percent higher on plots from which livestock were excluded. The abundance of small mammals in the diet of spotted owls has been related to reproduction. Ward and Block (1995) suggested that a single prey species did not influence the owl’s reproductive success, but by many species in combination. None of the specific prey groups significantly influenced owl reproductive success, but, they concluded it was more likely that total prey biomass consumed in a given year influenced the owl's reproductive success, rather than a single prey species. More young were produced when moderate to high amounts of the three most common prey groups (woodrats, peromyscid mice, and voles) were consumed.

Optimal foraging theory predicts that predators consume prey providing the greatest energetic benefit-to-cost ratio (Krebs 1978). Theoretically, selection of larger prey should give parents an energetic surplus enabling them to meet the increased energy demands associated with producing young (White 1996). Thrailkill and Bias (1989) and White (1996) found that the diet of California and northern spotted owls that successfully fledged young differed significantly in terms of prey size from the diet of owls that failed to fledge young. Specifically, White (1996) found the northern spotted owls which successfully fledged young ate significantly more large prey items (*Neotoma* spp.) than unsuccessful owls. Unsuccessfully breeding owls consumed more medium and small prey (*Glaucomys* spp, *Arborimus* spp., *Clethrionomys* spp., *Peromyscus* spp., *Microtus* spp.) which White related to the increased energetic demands of transporting prey back to a central place such as a nest, thereby resulting in an energetic trade-off. Ultimately, this would cause spotted owls to suspend breeding in a given year if food fell below levels necessary to maintain adult energy requirements. Thrailkill and Bias (1989) found that successful breeding in California spotted owls was correlated to a diet consisting of a greater relative proportion of large mammal prey. Thrailkill and Bias (1989) were unable to infer whether their results indicated a preferential selection of large mammal prey by breeding pairs or greater availability of large mammal prey within territories of breeding pairs. Ward (1990) found a different pattern for northern spotted owls. He found that large prey was taken in relatively equal frequency by breeding and nonbreeding owls, presumably because woodrats were a common food resource for owls no matter breeding status. Barrows (1987) found shifts by breeding spotted owls to larger prey items post-hatching which contrasted with the opposite trend in non-breeding owls, supporting a hypothesis of preferential predation on larger prey by breeding pairs. Zabel et al. (1995) found that home range size of northern spotted owls is influenced by density of food and patterns of dispersion. Specifically, they found that owls preying on the larger woodrat (*Neotoma*) did not need to forage as widely as owls preying on flying squirrels (*Glaucomys sabrinus*) to meet their energy requirements.

Evidently, both abundance and biomass of individual prey as well as prey species diversity is important for owl reproduction. If adequate prey exists for owls in a PAC it will likely increase the probability of reproductive success and decrease energy depletion by allowing successful foraging to occur closer to the nest site. Both in the summer and winter, meadows provide the greatest biomass for Mexican spotted owl prey (Ward and Block 1995).

Monitoring since 1989 of the three PAC's within the two EMAs which contain riparian habitat (November 1998 Biological Assessment) indicate the following:

PAC #0503007	PAC # 0503010	PAC # 0503011
1993 - A	1991 - O, NU	1991 - NU
1994 - A	1992 - O, NU	1992 - O, 2Y
1995 - NI	1994 - IM-NR	1994 - O, NN

1996 - O, NY	1995 - A	1995 - O, NN
1997 - NI	1996 - NI	1996 - NI
	1997 - NI	1997 - NI

(NI= no information; Y=young; NU=nesting unknown; NR=no response; O=occupied; NN=non-nesting; NF=nest failed; M=male; F=female; A=no information)

Drawing direct correlations between reproductive success in these three PAC's and grazing in riparian areas is impossible. Reproduction has varied over the last approximately 10 years and this could be due to a variety of reasons. This information is presented to illustrate that reproduction in the PAC's has been non-existent or unknown in the last five years.

The Recovery Plan provides explicit goals for managing grazing in protected and restricted habitat. One such goal is monitoring use by livestock and wildlife in "key grazing areas". These areas are primarily riparian areas, meadows, and oak types. Other goals include maintaining good to excellent range conditions in key areas while accommodating the needs of the owl and its prey; implementing and enforcing grazing utilization standards that would attain good to excellent range condition within the key grazing area; establishing maximum allowable use levels that are conservative and that will speed attaining and maintaining good to excellent range condition; ensuring that the allowable use of plant species will maintain plant diversity, density, vigor, and regeneration over time; restore adequate levels of residual plant cover, fruits, seeds, and regeneration to provide for the needs of prey species; and restoring good conditions to degraded riparian communities.

Within conifer forests, grazing can remove or greatly reduce grasses and forbs, thereby allowing many conifer seedlings to become established because of reduced competition for water and nutrients. Establishment of seedling conifers coupled with the reduction in light ground fuels (e.g., grasses and forbs) may act with fire suppression to contribute to building of fuels in the forest, alter forest structure, and decrease the potential for beneficial low-intensity ground fires while increasing the risk of catastrophic fire (USFWS 1995a). Grazing may also affect oak regeneration.

Across the seven EMA's with PAC's, allowable utilization for allotments ranges from 35 to 55 percent for uplands and 40 to 45 percent for riparian areas. Many allotments have no vegetation utilization standards for riparian areas. If these levels of vegetation utilization occur within riparian areas within PAC's, the MSO could be adversely affected. The Service believes that inadequate range conditions and cover may affect the ability of Mexican spotted owl to successfully produce young.

The grazing utilization guidelines in the amended Forest Plans are based on recommendations in the MSO Recovery Plan to manage for good to excellent range conditions. The utilization criteria in the amended Forest Plans are only guidance to the Forests, but not implementing them does not follow the Recovery Plan. The Service believes the utilization guidelines in the amended Forest Plans are the minimum necessary to provide adequate cover for MSO prey species and provide for fire management. Unless there is site-specific data proving that higher utilization provides cover for MSO prey and for fire management, the utilization guidelines should be used. Because the importance of riparian areas and mountain meadows has been demonstrated to be important for rodent species, at the very minimum the utilization guidelines should be rigorously applied to livestock grazing in riparian areas within MSO PAC's. In the section 7 consultation on the amended Forest Plans, the Service assumed "that activities will be planned within the bounds of the amended guidelines for the Mexican spotted owl as well as the grazing management guidelines (November 25, 1996; 000031RO)(pg. 23).

The information presented in the November 1998, Biological Assessment does not clearly show isolation of all PAC's from livestock. Also, vegetation utilization within PAC's is unknown as is the existence of riparian habitat and riparian conditions within them. Given the information presented by the Forest Service to date, the Service is concerned about the three PAC's located in the Huachuca and Whetstone EMA's (0503011, 0503006, 0503007).

The Lone Mountain allotment in the Huachuca EMA contains two PAC's that are of concern (0503006 and 0503011). The allotment is large and divided into 27 pastures, giving the operator management flexibility. Because of diligent management by the permittee, range condition is much better (75 percent in moderately high condition with an upward trend) than most allotments in the San Rafael Valley area. The Forest is requesting consultation for a long term permit (10 years - *in litt.* April 2, 1999). The Forest Service states in the BA (USFS 1998c) that grazing within PAC's in this allotment is limited to 35 percent utilization. But the Forest Service's April 2, 1999, letter to the Service states that riparian utilization in the PAC's in the Lone Mountain allotment would not exceed 30 percent utilization on browse in the riparian areas, and would not exceed 50 percent in the uplands. Within PAC's, grazing would occur in the winter (November through March) (*in litt.* April 2, 1999). In the Wakefield Pasture, which includes most of the upper Bear Creek (0503011) PAC, and in the Peterson Pasture, which includes most of the Sunnyside PAC (0503006), the following conditions will be met when the cattle leave those pastures: Utilization of riparian trees, seedlings, and saplings will not exceed 30 percent, average stubble height not to be less than 25 to 33 cm (10-13 in) on grazed deer grass, and streambank alteration not to exceed 10 percent (see Table 18 in the Environmental Baseline for the Huachuca water umbel). These conditions were developed for Huachuca water umbel, but should also provide habitat and cover for MSO prey species.

The Lone Mountain allotment contains more than 810 ha (2,000 ac) of riparian habitat. The area of such habitat and the condition of the habitat within these two PAC's are unknown. However, the PAC's include portions of Sunnyside Canyon (0503006) and Bear Canyon (0503011). Sunnyside and Bear canyons support perennial flow and cienega conditions. These PAC's are in the upper portions of these drainages that generally receive less grazing pressure than lower elevation areas. Conditions of the lower portions of these drainages were described in the Environmental Baseline and Effects of the Action for the Huachuca water umbel. In March

1999, habitat conditions were degraded due to grazing in Lone Mountain Canyon and a tributary southwest of Wakefield Camp. Conditions were also degraded in lower Bear Canyon and in lower Wakefield (or Van Horn) Canyon. Discussions among the Forest, the Service, and the ranch managers (Jim and Ann Patton) resulted in changes to the proposed action that included additional exclosures, a riparian pasture, and criteria for removal of cattle, all of which are described in the writeup for the water umbel in this opinion. Existing and proposed exclosures and the riparian pasture in the Bear Pasture are downslope of PAC's, but MSO's could potentially use these areas in winter. Winter grazing, as proposed in the PAC's, occurs when there are natural decreases in small mammal populations. However, Ward and Block (1995) indicate those adequate winter food resources increases the likelihood of MSO egg laying and decreases the rate of nest abandonment. Livestock use of the riparian habitat in these PAC's may affect prey densities and possibly reproductive output of the owls.

The Whetstone EMA contains one PAC (0503007), in the Mescal allotment. Perennial water runs along the northern edge of the PAC, and over 162 ha (400 ac) of riparian habitat is present in the allotment (USFS 1998c). Livestock use occurs in the winter and spring (11/1-4/30) at utilization levels of 45 percent. The range condition and trend information indicates that the majority of the allotment is in good (moderately high) condition with a static trend. The BA also indicates that salt placement occurs within this PAC. The effect of high utilization in the riparian habitat in this PAC is similar to that discussed previously. Salt placement congregates livestock and results in increased utilization of vegetation as well as increased trampling of vegetation. Time of livestock use in this PAC is the winter as well as the beginning of the breeding season. This is a time when owls need an adequate amount of prey to reproduce successfully. The Service believes high utilization levels as well as salt placement are not consistent with the recommendations of the Recovery Plan to maintain good to excellent range conditions. This may affect MSO reproduction in this PAC.

In summary, the Service believes that reproductive success of MSO associated with three PAC's (0503006, 0503011, 0503007), may be negatively affected due to the high utilization by livestock within riparian areas in these PAC's. These three PAC's are found within the Lone Mountain and Mescal allotments. Good to excellent range conditions are largely being met on the Lone Mountain and Mescal allotments, as the Recovery Plan recommends. The Biological Assessment recognizes that grazing is occurring in riparian habitat.

Cumulative Effects

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are subject to the consultation requirements established under section 7, and, therefore, are not considered cumulative in the proposed action. In past biological opinions, it has been stated that, "Because of the predominant occurrences of MSO on Federal lands, and because of the role of the respective Federal agencies in administering the habitat of the MSO, actions to be implemented in the future by non-Federal entities on non-Federal lands are considered of minor impact." However, there has been a recent increase of harvest activities on non-Federal lands within the range of the MSO. In addition, future actions within or next to the project area that may occur include urban development, road building and widening, land clearing, trail construction, and other associated actions. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and cause disturbance to breeding MSO, and would contribute as cumulative effects to the proposed action.

Conclusion

After reviewing the current status of the Mexican spotted owl, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the Service's biological opinion that the action as proposed, is not likely to jeopardize the continued existence of the MSO. No critical habitat is designated for this species, therefore; none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

For the purposes of consideration of incidental take of MSO from the proposed action under consultation, incidental take can be broadly defined as either the direct mortality of individual birds, or the alteration of habitat that affects the behavior (i.e., breeding or foraging) of birds to such a degree that the birds are considered lost as viable members of the population and thus "taken". They may fail to breed, fail to successfully rear young, raise less fit young, or desert the area because of disturbance or because habitat no longer meets the owl's needs.

The Service believes incidental take is likely to occur if an activity compromises the integrity of a PAC as identified in the recovery plan (USFWS 1995a:84-89). Actions outside PAC's will generally not cause incidental take, except in cases when areas that may support owls have not been adequately surveyed.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that take of Mexican spotted owl will be difficult to detect because finding a dead or impaired specimen is unlikely. However, the level of incidental take can be anticipated by the loss of essential elements in the habitat that would affect the reproductive success of the species. The primary type of take anticipated from grazing on the Lone Mountain and Mescal Allotments is through harm by the reduction of suitability of the habitat for prey species, thus limiting the availability of prey for owls. This would impair the ability of Mexican spotted owl adults to successfully raise young. The Service anticipates that incidental take will occur to one pair of Mexican spotted owls and their young associated with each of the following PAC's: 0503010, 0503011, 0503007, for a total of three pairs.

Take attributable to the proposed action will be difficult to detect and often the cause of any observed mortality will be impossible to detect. However, the level of take anticipated above could either be detected by finding birds taken because of the proposed action, or the following surrogate condition is met:

1. Required monitoring and reporting of utilization levels is not completed within the designated time frames.

These conditions are surrogates for take because they correspond to important aspects of the proposed action that if not implemented as proposed would likely result in harm to MSO as described above.

This biological opinion does not authorize any form of take not incidental to implementation of the Coronado National Forest grazing program. If, during project activities, this amount of extent of take is exceeded, the Forest Service must reinitiate consultation with the Service immediately to avoid violation of section 9. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible or adverse impact on the species, as required by 50 CFR 402.14(i). An explanation of the causes of the taking will be provided to the Service.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the take of MSO:

1. Implement and enforce grazing restrictions in riparian areas within the identified PAC's within the Lone Mountain and Mescal allotments.

2. Monitor grazing use by livestock in key grazing areas (riparian areas, meadows, oak types)(USFWS 1995a) in the Lone Mountain and Mescal allotments. Report findings to the Service annually for the ten-year term of the Lone Mountain allotment, and until site-specific allotment management plans are completed for the Mescal allotment (refer to the general term and condition for reporting at the end of this opinion).

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary. The following terms and conditions are necessary to implement the reasonable and prudent measures. Term and condition 1.a and 1.b were developed for the Huachuca water umbel and are part of the proposed action. Their use will also benefit the Mexican spotted owl.

1. The following terms and conditions implement reasonable and prudent measure number 1:

   a. Implement riparian grazing restrictions as proposed for the Wakefield and Peterson pastures of the Lone Mountain allotment.

   b. Establish specific parameters that will be used to determine when sufficient residual biomass has accumulated on the streambank in the Bear Canyon riparian pasture (unit 6). Provide this information to the Service by January 2000.

   c. Ensure that salt is placed at least 500 m (1,650 ft) from riparian areas in PAC 0503007 in the Mescal allotment.

2. The following terms and conditions implement reasonable and prudent measure number 2:

a. Identify locations of key forage monitoring areas and key species in the Lone Mountain and Mescal allotments as outlined in the ROD for the Amended Forest Plans (p.94). Each of the identified PAC's (0503006, 0503011, 0503007) will contain at least one key area, and at least one key area in each allotment will be in a grazed riparian area. Provide this information to the Service by January 2000. Key areas should include meadows, riparian areas, and oak types.

b. In the Mescal allotments, monitor the above identified key forage monitoring areas at least once in the next three years. In the Lone Mountain allotment, monitor key areas at least once in the first five years and at least once in the second five years.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that no more than one pair of spotted owls and their associated young associated with each of the three PAC's (0503006, 0503011, 0503007) (three pairs) will be incidentally taken. If, during the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Forest Service must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

To the extent that this statement concludes that take of any threatened or endangered species of migratory bird will result from the agency action for which consultation is being made, the Service will not refer the incidental take of any such migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C.§§ 703-712), if such take is in compliance with the terms and conditions (including amount or number) specified herein.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Implement management strategies that will restore good conditions to degraded riparian communities when possible. This includes reduce grazing levels, increase the number of exclosures to protect riparian habitat, complete rest of riparian areas, establishment of riparian pastures, limited winter use, and removal of allotments from use (Recovery plan task 22, USFWS 1995a:132).

2. Develop utilization standards for local geographic areas and habitat types, particularly in key habitat types such as riparian areas, meadows, and pine/oak and mixed conifer forests, that incorporate allowable use levels based on current range conditions, key species, and the type of grazing system and standards which will accomplish moving rangeland conditions to good to excellent in the most expedient manner possible (Recovery plan task 22, USFWS 1995a:132).

3. Apply a 35 percent or lower utilization standard across all pastures in the Mescal allotment (Recovery plan task 211, USFWS 1995a:132).

4. Exclude livestock from riparian areas or limit vegetation utilization to those in the Allowable Use Guide in riparian areas and meadows within PAC's, in areas outside PAC's that may be used for foraging by MSO, and in potential habitat for the MSO (Recovery plan task 22, USFWS 1995a:132).

5. The issues of high utilization levels in all allotments and the lack of site-specific data and monitoring of use in PAC's, particularly in riparian areas need to be addressed in detail in the upcoming AMP's (Recovery plan task 22, USFWS 1995a:132).

6. Develop and initiate studies to gain a comprehensive understanding of how grazing affects the habitat of the Mexican spotted owl and its prey species (Recovery plan task 4142, USFWS 1995a:134).

HUACHUCA WATER UMBEL (*Lilaeopsis schaffneriana* ssp. *recurva*)

Status of the Species

The Huachuca water umbel was listed as an endangered species on January 6, 1997 (USFWS 1997a). Critical habitat was designated on the upper San Pedro River, Garden Canyon on Fort Huachuca, and other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek on July 12, 1999 (USFWS 1999b). The umbel is an herbaceous, semiaquatic perennial plant with slender, erect leaves that grow from creeping rhizomes. The leaves are cylindrical, hollow with no pith, and have septa (thin partitions) at regular intervals. The yellow/green or bright green leaves are generally 1 to 3 mm (0.04-0.12 in) in diameter and often 3 to 5 cm (1-2 in) tall, but can reach up to 20 cm (8 in) tall under favorable conditions. Three to 10 very small flowers are borne on an umbel that is always shorter than the leaves. The fruits are globose, 1.5 to 2 mm (0.06-0.08 in) in diameter, and usually slightly longer than wide (Affolter 1985). The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs because of the dislodging of clumps of plants which then may reroot in a different site along aquatic systems.

Huachuca water umbel was first described by A. W. Hill based on the type specimen collected near Tucson in 1881 (Hill 1926). Hill applied the name *Lilaeopsis recurva* to the specimen, and the name prevailed until Affolter (1985) revised the genus. Affolter applied the name *L. schaffneriana* ssp. *recurva* to plants found in Arizona, while plants from Mexico and northern South America were called *L. s.* ssp. *schaffneriana*.

Huachuca water umbel has been documented from 25 sites in Santa Cruz, Cochise, and Pima counties, Arizona, and in adjacent Sonora, Mexico, west of the continental divide (Warren et al. 1989, Saucedo 1990, Warren et al. 1991, Warren and Reichenbacher 1991, Haas and Frye 1997, Service files). The plant has been extirpated from six of the 25 sites. The 19 extant sites occur in four major watersheds - San Pedro River, Santa Cruz River, Rio Yaqui, and Rio Sonora. All sites are between 1,070 to 1,980 m (3,500-6,500 ft) elevation.

Huachuca water umbel has an opportunistic strategy that ensures its survival in healthy riverine systems, cienegas, and springs. In upper watersheds that generally do not experience scouring floods, the umbel occurs in microsites where interspecific plant competition is low. At these sites, the umbel occurs on wetted soils interspersed with other plants at low density, along the periphery of the wetted channel, or in small openings in the understory. The upper Santa Cruz River and associated springs in the San Rafael Valley, where a population of Huachuca water umbel occurs, is an example of a site that meets these conditions. The types of microsites required by the umbel were generally lost from the main stems of the San Pedro and Santa Cruz rivers when channel entrenchment occurred in the late 1800's to early 1900's. Habitat on the upper San Pedro River is recovering, and Huachuca water umbel has recently been found along short reaches of the main channel.

In stream and river habitats, Huachuca water umbel can occur in backwaters, side channels, and nearby springs. After a flood, it can rapidly expand its population and occupy disturbed habitat until interspecific competition exceeds its tolerance. This response was recorded at Sonoita Creek in August 1988, when a scouring flood removed about 95 percent of the Huachuca water umbel population (Gori et al. 1990). One year later, the umbel had recolonized the stream and was again codominant with the exotic watercress *(Rorippa nasturtium-aquaticum)*(Warren et al. 1991). The expansion and contraction of Huachuca water umbel populations appear to depend on the presence of “refugia” where the species can escape the effects of scouring floods, a watershed that has an unaltered hydrograph, and a healthy riparian community that stabilizes the channel.

Density of umbel plants and size of populations fluctuate in response to both flood cycles and site characteristics. Some sites, such as Black Draw, have a few sparsely-distributed clones, possibly due to the dense shade of the even-aged overstory of trees, dense nonnative herbaceous layer beneath the canopy, and deeply entrenched channel. The Sonoita Creek population occupies 14.5 percent of a 533 square meter (5,385 square ft) patch of habitat (Gori et al. 1990). Some populations are as small as 1 to 2 square meters (11-22 square ft). Scotia Canyon, by contrast, has dense mats of leaves. Scotia Canyon contains one of the larger Huachuca water umbel populations, where in 1995 it occupied about 64 percent of a 1,420 m (4,660 ft) reach (Falk 1998).

While the extent of occupied habitat can be estimated, the number of individuals in each population is difficult to detect because of the intermeshing nature of the creeping rhizomes and the predominantly asexual mode of reproduction. A “population” of Huachuca water umbel may be composed of one or many genetically distinct individuals.

Overgrazing, mining, hay harvesting, timber harvesting, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and cienegas when above-average precipitation and flooding occurred in the late 1800's and early 1900's (Bryan 1925, Martin 1975, Hastings and Turner 1980, Dobyns 1981, Hendrickson and Minckley 1984, Sheridan 1986, Bahre 1991, Webb and Betancourt 1992, Hereford 1993). A major earthquake near Batepito, Sonora, approximately 65 km (40 mi) south of the upper San Pedro Valley, resulted in land fissures, changes in groundwater elevation and spring flow, and may have preconditioned the San Pedro River channel for rapid flood-induced entrenchment (Hereford 1993, Geraghty and Miller, Inc. 1995). These events contributed to long-term or permanent degradation and loss of cienega and riparian habitat on the San Pedro River and throughout southern Arizona and northern Mexico. Much habitat of the Huachuca water umbel and other cienega-dependent species was presumably lost then. Habitat is apparently recovering on the upper San Pedro River, as evidenced by the recent finding of several populations of water umbel from Hereford to the Tombstone gage. Recent introduction of beaver to the upper San Pedro River could further hasten the recovery of cienega conditions.

Wetland degradation and loss continues today. Human activities such as groundwater overdrafts, surface water diversions, impoundments, channelization, improper livestock grazing, chaining, agriculture, mining, sand and gravel operations, road building, nonnative species introductions, urbanization, wood cutting, and recreation all contribute to riparian and cienega habitat loss and degradation in southern Arizona. The local and regional effects of these activities are expected to increase with the increasing human population.

Dredging extirpated the Huachuca water umbel from House Pond, near the extant population in Black Draw (Warren et al. 1991). The umbel population at Zinn Pond in St. David near the San Pedro River was probably lost when the pond was dredged and deepened. This population was last documented in 1953 (Warren et al. 1991). A population along the Cimmaron Road near the western boundary with Fort Huachuca was temporarily extirpated or could not be found when road construction activities buried the plants in sediment. However, plants have been found.

Livestock grazing can affect the umbel through trampling and changes in stream hydrology and loss of stream bank stability. However, existence of the umbel appears to be compatible with well-managed livestock grazing (USFWS 1997a). In overgrazed areas, stream headcutting can threaten cienegas where the umbel occurs. Such headcutting occurs at Black Draw just south of the international boundary and at Los Fresnos, in the San Rafael Valley, Sonora. Groundwater pumping has eliminated habitat in the Santa Cruz River north of Tubac, and threatens habitat in the San Pedro River. Severe recreational impacts in unmanaged areas can compact soils, destabilize stream banks, and decrease riparian plant density, including densities of the Huachuca water umbel. Trampling and off-highway vehicles have affected populations in Bear Canyon in the Huachuca Mountains.

Of particular concern is the fate of populations and habitat on the upper San Pedro River. The upper San Pedro River, where 54.2 km (33.7 mi) are designated as critical habitat (USFWS 1999b), is the only extensive reach of habitat for this species. The San Pedro River is considered the most important recovery habitat. Groundwater overdraft of approximately 7,000 acre feet per year has created a large cone of depression under Fort Huachuca and Sierra Vista. The cone of depression captures mountain front recharge that otherwise would reach the San Pedro River and either has or will soon contact the river itself (MacNish 1998, San Pedro Expert Study Team 1998). Portions of the San Pedro River occupied by the umbel could be dewatered within a few years unless measures are implemented very soon to halt or mitigate groundwater pumping in the Sierra Vista-Fort Huachuca area (ASL 1998, US Bureau of Land Management 1998). The location of the cone of depression, groundwater flow patterns, and the presence of a clay deposit near the river suggest the perennial reach downstream of Charleston or Lewis Springs will be affected first (Don Pool, USGS, pers. comm., 1999; MacNish 1998).

A suite of nonnative plant species has invaded wetland habitats in southern Arizona (Stromberg and Chew 1997), including those occupied by the Huachuca water umbel [Arizona Department of Water Resources (ADWR) 1994]. Occasionally their effect on the umbel is unclear. However, in certain microsites, the nonnative Bermuda grass *(Cynodon dactylon)*, may directly compete with the umbel. Bermuda grass forms a thick sod in which many native plants are unable to establish. Watercress is another nonnative plant now abundant along perennial streams in Arizona. It is successful in disturbed areas and can form dense monocultures that can outcompete Huachuca water umbel populations.

Limited numbers of populations and the small size of populations make the Huachuca water umbel vulnerable to extinction because of stochastic events that are often exacerbated by habitat disturbance. For instance, the restriction of this taxon to a relatively small area in southeastern Arizona and adjacent Sonora increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction. Populations are commonly isolated, as well, which makes the chance of natural recolonization after extirpation less likely. Small populations are also subject to demographic and genetic stochasticity, which increases the probability of population extirpation (Shafer 1990, Wilcox and Murphy 1985).

Environmental Baseline in the Action Area

Vegetation Communities and Environmental Setting

The three allotments that support water umbel populations lie on the west slope of the Huachuca Mountains (Manila and Lone Mountain allotments) and in the Canelo Hills (Papago allotment) in southeastern Arizona. Elevations range from 1,220 m (4,000 ft) on the Papago allotment to 2,880 m (9,450 ft) on the Lone Mountain allotment. Terrain is mountainous and steep at the higher elevations, but fairly rolling and gentle terrain dominates at the lower elevations. Vegetation communities include Petran montane conifer forest, madrean evergreen woodland, and plains/great basin grasslands (Brown and Lowe 1980, Brown 1982). Riparian plant associations occur as stringers in canyon bottoms. Patches of chaparral communities also occur within the project area (USFS 1998c).

The Huachuca Mountains and Canelo Hills have a long history of human use. However, it is unclear precisely how those uses have affected the habitats of the Huachuca water umbel. Evidence of historic mining activity is commonly encountered throughout the area (Taylor 1991), but mining was probably more important in the Patagonia Mountains to the west and at Tombstone and Bisbee (Hereford 1993, Hadley and Sheridan 1995). Nevertheless, direct impacts of mining, such as tailings piles, roads, areas cleared for settlements, and probably most important, fuelwood harvest to support the mines and settlers, likely resulted in localized denuded landscapes and degraded watersheds (Hadley and Sheridan 1995.) A sawmill operated in Sunnyside Canyon probably in the late 1800's. Other sawmills operated in Carr, Ramsey, Sawmill, and Miller canyons in the Huachuca Mountains (Taylor 1991). By 1902 all usable timber had been harvested from the Huachuca Mountains [General Wildlife Services no date].

Cattle were grazed in the area as early as 1680 (Hadley and Sheridan 1995). Free-ranging cattle were abundant on Fort Huachuca in 1886 when the post quartermaster requested fencing of the installation to protect forage for cavalry horses (General Wildlife Services no date). Severe drought combined with overstocking in the 1880's and 1890's led to overgrazing in the region. During the drought, some ranchers drove cattle from the San Rafael Valley into the Huachuca

Mountains where forage was cut from oak and ash trees to keep the cattle alive (Hadley and Sheridan 1995.) The Huachuca Forest Reserve, a precursor to the Coronado National Forest, was established in 1906. At that time policies were initiated to limit grazing to within range capacity and to protect timber resources. These policies were strengthened over time.

Fire regimes for the Garden Canyon watershed and in a study area around Pat Scott Peak in the Huachuca Mountains were reconstructed using dendrochronology (Danzer et al. 1997). Before 1870, fires were frequent (mean of 4-8 years), low-intensity (ground fires), and widespread. Since 1870, only two widespread fires occurred (1899 and 1914) in the study area. Danzer et al. (1997) attribute this change in fire regime to extensive use of timber, mineral, range, and water resources and associated reductions in fuel loads. Active fire suppression by the Forest Service and others also reduced fire frequency. Exclusion of fire has promoted encroachment of shade-tolerant, less fire-resistant tree species such as Douglas fir, gambel oak, and southwestern white pine, and inhibited growth of pondersosa pine. The 1899 fire was a devastating crown fire that halted all large-scale logging operations at the "Reef" in Carr Canyon and below Ramsey Peak on Fort Huachuca (Danzer et al. 1997.) Danzer et al. (1997) suggest that the fire regime has been altered from frequent, low intensity fire to infrequent, stand-replacing fires. Recent stand-replacing fires on Carr Peak, Miller Peak, and Pat Scott Peak support this hypothesis.

In grassland and oak woodlands of southeastern Arizona, fire intervals can only be inferred from adjacent forest communities where dendrochronological evidence can be collected, or from historical accounts. Fire return intervals in the desert grassland community have been estimated at approximately 8 to 20 years (Wright and Bailey 1982, McPherson 1995, Howell 1996, Kaib et al. 1996). Natural fire has been excluded from these communities primarily because of livestock overgrazing and drought which removed fine fuels, and past fire suppression. Lack of natural fires and overgrazing have resulted in encroachment or increased density of woody species such as mesquite and juniper, and various half-shrub woody species. There has also been a reduction in coverage of perennial grasses. This conversion of grasslands to shrublands and woodlands has reduced available forage for livestock and some wildlife species, runoff and soil erosion has increased, and some wildlife species characteristic of woodlands have benefitted.

Most canyons in the Huachuca Mountains and Canelo Hills today are either too dry to support Huachuca water umbel, or existing permanent streams exhibit high gradients in narrow, shaded canyons that do not provide the boggy, cienega conditions required by this plant. Whether conditions were different in pre-settlement times is unknown and cannot be reconstructed from available historic accounts. However, erosion in watersheds degraded by overgrazing, timber harvest, and mining, and erosion and downcutting in streams after stand-replacing fires that began in 1899, may have largely eliminated cienega habitats in the canyons of the Huachuca Mountains. Observations of historic versus current distribution of leopard frogs *(Rana pipiens* complex*)*, suggest wetland habitats in the canyons of the Huachuca Mountains may have been altered in historic times. Leopard frogs, which are primarily frogs of low-gradient streams and boggy pools and ponds, were once found in many canyons in the Huachuca Mountains. The frogs are largely absent today, low-gradient streams and sizeable natural pools and ponds are almost nonexistent, and the only places leopard frogs are found with regularity in the Huachuca Mountains are constructed ponds and livestock tanks.

Status of Huachuca Water Umbel in the Project Area

All extant populations of water umbel within Coronado National Forest allotments occur on the west slope of the Huachuca Mountains and the east side of the San Rafael Valley (Bear and Lone Mountain canyons and associated tributaries; Scotia and Sunnyside canyons, Sycamore Springs in Sycamore Canyon; Mud Springs, Joaquin Creek, O'Donnell Creek, Freeman Springs, and a population at the Cimarron Road Crossing). The location of these sites by allotment and proposed grazing regime is listed in Table 18. Grazing regimes for some sites on the Lone Mountain allotment do not correspond to that proposed in the Coronado's Biological Assessment, but were agreed to in the field at a meeting on March 24, 1999, among representatives of the permittee (Jim and Ann Patton), and personnel from the Forest Service and the Service. These changes in the proposed action were described in an April 2, 1999, letter from the Forest to this office. Populations in Bear, Lone Mountain, Scotia and Sunnyside canyons, and associated tributaries, all on the Lone Mountain allotment, are in critical habitat designated for the species (USFWS 1999b).

Localities of the Huachuca water umbel in and near the Lone Mountain, Manila, and Papago allotments are summarized in USFS (1998c) and Haas and Frye (1997). On the Lone Mountain allotment, the water umbel is found in a 2.1 km (1.3 mi) reach of Scotia Canyon, a 0.6 km (0.4 mi) reach of Sunnyside Canyon, about a 0.3 km (0.2 mi) reach of Sycamore Canyon immediately downstream of Sycamore Spring, <98 m (320 ft) reach of Mud Spring, a 0.6 km (0.4 mi) reach of Lone Mountain Canyon, and in several reaches of Bear Canyon totaling about 3.5 km (2.2 mi)(USFS 1998c). The plant is also found on roughly 1.9 km (1.2 mi) of two tributaries of Lone Mountain Canyon, an 1.0 km (0.6 mi) reach of a tributary to Bear Canyon, and at several other small locations in the Bear and Lone Mountain canyon area (Gori et al. 1990, Haas and Frye 1997, USFS 1998c; Mima Falk, Coronado National Forest, pers. comm., 1999; J. Rorabaugh, Service, pers. obs., 1995-9). On the Papago allotment, the water umbel occurs at springs or short reaches of streams at Freeman Springs and O'Donnell Creek (USFS 1998c). On the Manilla allotment, the plant was found in a creek at Cimarron Road near the boundary with Fort Huachuca. The plant was apparently extirpated below the road because of road construction and possibly upstream water diversion, but still occurs upstream on private lands and could recolonize the site. The umbel does not occupy all portions of the reaches described here, but rather is found intermittently within an estimated 2.5 km (1.55 mi) of these canyons on the Forest (USFS 1998c).

Other populations occur off-Forest but nearby on Fort Huachuca, the San Pedro Riparian National Conservation Area, Empire-Cienega Resource Conservation Area, Sharp Ranch-San Rafael Valley, Lone Mountain Ranch, and Sonoita Creek. A population in Leslie Canyon,

Table 18. Location by allotment and proposed grazing regime of Huachuca water umbel populations on the Coronado National Forest.

Location	Proposed Grazing Strategy
Lone Mountain Allotment (Grazing regime proposed for 10 years)	
Bear Canyon and 1 tributary	1.2 km (0.75 mi) of exclosure near Wakefield Camp, 2.4 km (1.5 mi) of riparian pasture (Bear Pasture) downstream of the Wakefield exclosure. Bear Pasture to be rested until sufficient biomass has accumulated in deergrass on the streambanks (~2 growing seasons). Then, a herd of 50 cows only would graze it during winter when riparian trees are dormant. Utilization of riparian trees, seedlings, and saplings not to exceed 30%. Utilization of upland browse would vary from 35-45% of annual herbaceous forage. In the stream bottom, average stubble height on deergrass of at least 25-33 cm (10-13"), with the lower limit applying to smaller plants and the upper limit applying to more robust plants, and streambank alteration[1] not to exceed 10% when cattle leave the pasture.
Lone Mtn Canyon and 2 tributaries (Wakefield Pasture)	2.8 ha (7 acre) exclosure near the Bear Creek confluence proposed. Other reaches and 2 tributaries grazed opportunistically during the winter months (November-March) and only when winter rains are sufficient to provide adequate water throughout the pasture to encourage livestock dispersal away from the canyon bottom. Utilization of riparian trees, seedlings, and saplings not to exceed 30%. Utilization of upland browse would vary from 35-45% of annual herbaceous forage. In the stream bottom, average stubble height on deergrass of at least 25-33 cm (10-13"), with the lower limit applying to smaller plants and the upper limit applying to more robust plants, and streambank alteration not to exceed 10% when cattle leave the pasture.
Sunnyside Canyon	Grazed opportunistically during the winter months (November-March) and only when winter rains are sufficient to provide adequate water throughout the pasture to encourage livestock dispersal away from the canyon bottom. Utilization of riparian trees, seedlings, and saplings not to exceed 30%. Utilization of upland browse would vary from 35-45% of annual herbaceous forage. In the stream bottom, average stubble height on deergrass of at least 25-33 cm (10-13"), with the lower limit applying to smaller plants and the upper limit applying to more robust plants, and streambank alteration not to exceed 10% when cattle leave the pasture.
Scotia Canyon	Exclosure in lower 2.8 km (1.75 mi) of Scotia Canyon proposed (would exclude cattle for at least 5 years, then conditions and need for exclosure would be reevaluated). Upper reach grazed in winter (November-March) and only when winter rains are sufficient to provide adequate water throughout the pasture to encourage livestock dispersal away from the canyon bottom. Utilization of riparian trees, seedlings and saplings not to exceed 30%. Utilization of upland browse does not exceed 35-45%. In the stream bottom, average stubble height on deergrass of at least 25-33 cm (10-13"), with the lower limit applying to smaller plants and the upper limit applying to more robust plants, and streambank alteration not to exceed 10% when cattle leave the pasture. Develop additional waters in uplands of the upper canyon to draw cattle away from the creek.
Mud Springs	Grazed in winter (November-March). Utilization of riparian trees, saplings, and seedlings not to exceed 30%. Utilization of upland browse not to exceed 50%.
Sycamore Springs	Grazed in winter (November-March). Utilization of riparian trees, saplings, and seedlings not to exceed 30%. Utilization of upland browse not to exceed 50%.
Joaquin Canyon	Grazed in winter (November-March). Utilization of riparian trees, saplings, and seedlings not to exceed 30%. Utilization of upland browse not to exceed 50%.
Papago Allotment (Grazing regime proposed for 3 years)	
Freeman Sp.	Cattle exclosure, no grazing
O'Donnell Cr.	Cattle exclosure, no grazing
Manilla Allotment (Grazing regime proposed for 3 years)	
Cimarron Road Crossing	Cattle exclosure proposed

[1] Methods to determine percent streambank alteration will be developed by the Service and the Coronado National Forest in coordination with the permittee.

Swisshelm Mountains, is approximately 6 km (4 mi) east of Forest lands in the Chiricahua Mountains. Estimated area occupied by the water umbel in some sites, particularly in the Lone Mountain and Bear canyons area, varies between surveys and among survey reports (see Gori et al. 1990, Haas and Frye 1997). However, this likely represents expansion and contraction of water umbel populations in response to floods, drought, or sometimes, lack of surveys by some authors in some reaches. The Service considers all sites in the project area where the species has been found by Haas and Frye (1997), Gori et al. 1990, Forest and Service personnel, or other botanists, to be suitable habitat for the species, although at anyone time or in specific sites the plant may be rare or absent.

Metapopulations of Huachuca water umbel were monitored in Bear and Scotia canyons in 1989, 1993, and 1995 (Gori et al. 1990, Falk and Warren 1994, Falk 1998). The Bear Canyon population increased in linear extent by 10 m (33 ft) and patches were found more frequently (umbel found on 46 percent versus 33 percent of transects across the creek) in 1993 as compared to 1989. By 1995, the umbel had expanded another 350 m (1,150 ft) along Bear Creek, but frequency decreased to 38 percent. In Scotia Canyon, the linear extent of the stream occupied by the water umbel varied from 1,066 m (3,494 ft) in 1989, to 1,431 m (4,722 ft) in 1993, and to 1,421 m (4,660 ft) in 1995. Frequency varied from 47 percent (1989) to 60 percent (1993) and 64 percent (1995). Because of the dynamic nature of riparian systems, variation from year to year is expected under natural conditions. As a result, long-term population trends cannot be discerned from these data. However, based on this limited sampling, populations in Bear and Lone Mountain canyons appear to be relatively stable.

Effects of the Action

The water umbel may be affected by livestock grazing in the following ways: 1) trampling by cattle, 2) direct impacts from construction of range projects, 3) changes in stream geomorphology that lead to erosion, sedimentation, and downcutting, and 4) watershed degradation and resulting adverse effects to stream hydrology. The umbel is an opportunistic, early- or mid-successional species that probably benefits from periodic disturbance, such as floods, fire, or perhaps grazing by livestock or wildlife. In areas without disturbance, other aquatic and semi-aquatic species, such as cattail, watercress, and bermuda grass may outcompete or reduce water umbel populations to remnant patches or to seeds or rhizomes (Haas and Frye 1997). Periodic disturbance opens these habitats up and allows recolonization or expansion of water umbel populations. Thus, occasional trampling by livestock, or periodic disturbance of bank and stream channels by livestock may mimic natural forms of disturbance that recreate early successional stages favorable for population expansion. However, continual or frequent disturbance, or severe damage to stream morphology, such as head cuts and downcutting would likely reduce populations or eliminate them from areas.

Disturbance of soils, possibly cryptobiotic crusts, and removal of vegetation in the watershed by grazing combine to increase surface runoff and sediment transport and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997). Effects are cumulative and interactive. Loss of vegetation cover and trampling of soils promotes deterioration of soil structure which in turn accelerates vegetation loss (Belsky and Blumenthal 1997). These changes in the watershed tend to increase peak flows and reduce low flows (DeBano and Schmidt 1989), making stream courses more "flashy". Thus, in degraded watersheds we expect more frequent sedimentation events that could bury plants, scouring events that may displace plants and bury them or move them downstream, and longer more severe drought periods in which flows are diminished or absent. These factors could have variable effects on water umbel populations. Because the water umbel is tolerant of some level of disturbance, if background levels of disturbance are relatively low, effects of watershed degradation may be minimal. However, additive effects of watersheds degraded by grazing, recreation, fire, historic mining, and other activities, and increased disturbance due to livestock trampling of plants and banks may be enough to reduce or eliminate umbel populations. In intermittent stream segments where water umbel occurs, such as in portions of Bear and Lone Mountain canyons, increased dry periods would reduce the ability of the plant to grow, reproduce, and expand populations. Even if the water umbel can survive long periods of drought as seeds or rhizomes (Haas and Frye 1997), at some point increasing aridity would eliminate the plant, including seed stock and rhizomes, from intermittent reaches.

The rediscovery of the Huachuca water umbel on the upper San Pedro River during the 1990's suggests that elimination of grazing and off-road vehicles after designation of the Riparian National Conservation Area in 1988 may have improved habitat for the water umbel. Riparian vegetation, especially understory and channel vegetation, has also recovered. However, the San Pedro River is very different from the stream, spring, and cienega habitats on the Forest, in that it periodically experiences large scouring flood events. Haas and Frye (1997) found no differences in a water umbel population near Lewis Springs before and after a 1997 flood event with peak flows of 3,000 cubic feet per second. Nevertheless, peak flows can be much larger and more destructive to populations of this small plant. Al Anderson (pers. comm., 1995) of the Gray Hawk Ranch witnessed the apparent extirpation of two patches of water umbel after a large flood in 1994. Similar eradication from stream reaches after a flood was observed by Warren et al. (1989) on Sonoita Creek. Nevertheless, the mechanisms that have lead to apparent reestablishment (or expansion) of water umbel populations on the San Pedro River (reduced disturbance from livestock and vehicles) could perhaps have the same effect elsewhere.

Additional information exists suggesting reduced levels of grazing can benefit the water umbel. Monitoring of umbel populations at Cottonwood Spring near Patagonia occurred before and after livestock were removed. Within two years following removal of cattle, the area became wetter and the riparian area expanded. The area occupied by the umbel increased, although it was becoming less dense in areas that were growing over with cattails and other wetland plant species (D. Gori and P. Warren, pers. comm., *in* Falk 1998).

In some systems, natural levels of disturbance may be relatively low, allowing establishment and growth of emergent and other wetland plants, such as sedges and cattails, that may crowd out water umbel. At the Van Horn exclosure on a tributary of Bear Canyon on the Lone Mountain allotment, wetland vegetation has become very dense. Water umbel has not been found within the exclosure recently, but occurs just downstream of it where the stream bed is much more open. Negative survey results within the exclosure could depend on the difficulty posed in finding water umbel among the dense vegetation, but this may be a site in which some level of grazing could improve the habitat for water umbel because natural levels of disturbance are low.

Lone Mountain Allotment

The Lone Mountain allotment is large and divided into 27 pastures, giving the operator great management flexibility. Because of diligent management by the permittee, range condition is much better (75 percent in moderately high condition with an upward trend) than most allotments in the San Rafael Valley area. The new Wakefield exclosure protects 1.2 km (0.75 mi) of a tributary to Bear Canyon that water umbel occupies. Exclosures of 2.8 ha (7 ac) and 2.8 km (1.75 mi) are proposed for Lone Mountain Canyon and lower Scotia Canyon, respectively. Construction of the 2.4 ha (7 ac) exclosure and associated recreational developments are being addressed in another consultation (2-21-99-I-097).

Water umbel populations outside exclosures would be grazed in winter. Populations in Scotia and Sunnyside canyons, Lone Mountain Canyon and its two tributaries, and Bear Canyon in the Bear Pasture would also be subject to the following restrictions: 1) average stubble height on deergrass is at least 25 to 33 cm (10-13 in), with the lower limit applying to smaller plants and the upper limit applying to more robust plants, 2) streambank alteration does not exceed 10 percent, and 3) grazing would occur only when winter rains are sufficient to provide adequate water throughout the pasture to encourage livestock dispersal away from the canyon bottom. These areas also correspond to critical habitat in the Lone Mountain allotment.

Winter grazing probably has varying effects on the water umbel depending on many factors, including 1) stocking rate, 2) availability of green forage and water other than that in water umbel habitat, 3) erodability of the soils in the stream bottom, and 4) sources of disturbance other than livestock grazing. All else being equal, the higher the stocking rate or the longer cattle are in water umbel habitat, the greater the potential for trampling of plants and degradation of habitat. In March 1999, at the end of an extremely dry winter, Service and Forest personnel observed heavy use of water umbel habitats in Lone Mountain Canyon and a tributary locally known as "Rattlesnake Canyon". In the lower part of Rattlesnake Canyon, only trampled water umbel specimens were found, banks were nearly completely disturbed, bank vegetation was absent or trampled, and headcuts were beginning in several places. However, the uplands appeared to be little used. During this very dry winter the cattle were clearly concentrating into the few remaining watered areas in the pasture where both water and some green vegetation were present. Unfortunately, these areas were also serving as refugia for water umbel.

Erodability of soils varies between sites and depends on the nature of the area's substrates, slope, and vegetation or rock armoring. In portions of Bear Canyon and Joaquin canyons the stream gradients are low and it is often flowing over bedrock, which makes these areas less susceptible to erosion and structural damage to the stream bed. However, in Rattlesnake Canyon, which is relatively narrow and steep, and not armored in bedrock, cattle use resulted in severe damage to banks.

Falk (1998) noted that the drainage in Scotia Canyon is incised in several places and there is little to no floodplain development. She further finds "many banks have little or no vegetation on them, there is a lack of large woody debris in the upper watershed that would serve to dissipate energy, thereby reducing the bedload to the gentler gradients where *Lilaeopsis* is found." The upper drainage on the private lands has a long history of human use, including several impoundments and a highly eroded and braided jeep trail that contribute to watershed degradation. These problems extend onto Forest lands. The Forest is considering closing the jeep trail at the Forest boundary, but a head cut threatens the lower impoundment. If the head cut breaches the tank, massive erosion and sedimentation would likely ensue in the water umbel habitat immediately downstream.

Current conditions and effects of grazing at some water umbel sites on the Lone Mountain allotment (Sunnyside Canyon, Sycamore and Mud Springs, Joaquin Canyon) are unknown, but recent grazing prescriptions for these areas were similar to that of grazed portions of Scotia, Lone Mountain, and Bear canyons. Thus, some same habitat degradation has probably occurred in these sites. As mentioned, Joaquin Canyon may be less susceptible to habitat damage due to low gradient and bedrock substrates.

As just described, some canyons on the Lone Mountain allotment are incised or exhibit head cuts; however, other factors besides grazing (such as erosion from roads, especially in upper Scotia Canyon, or from flood events possibly associated with fire) have probably contributed to structural degradation of the canyon bottoms. Upland watershed conditions on the Lone Mountain allotment appear good, which is supported by the allotment's relatively good range condition and trend. Thus, current range and watershed condition, at least outside the canyon bottoms, is probably not a factor in observed habitat degradation. Some of this apparent degradation may be quite old, predating use by the current permittee. However, contribution of recent grazing practices is difficult to tease out from these other factors that can cause degradation of water umbel habitat.

Because of the above observations that water umbel habitat is degraded in some canyons, the Forest modified the proposed action described in the Biological Assessment for the Lone Mountain allotment as follows: An exclosure in a 2.8 km (1.75 mi) reach of lower Scotia Canyon, limiting grazing in upper Scotia, Sunnyside, Lone Mountain Canyons, and associated tributaries, and Bear Canyon in the Bear Pasture to winter grazing with limits on deergrass stubble height and streambank alteration, grazing only in winters in which rainfall is sufficient to provide enough water for cattle dispersal away from the canyon bottoms, and no grazing in the Bear pasture until biomass of deergrass builds up enough to resist grazing pressure (residual dead material at the base of the plant inhibits use by cattle - a build up of such material may take two growing seasons). The 1.2 km (0.75 mi) Bear Canyon exclosure and the proposed 2.8 ha (7-ac) Lone Mountain Canyon exclosure are also recent changes to grazing practices in the Lone Mountain allotment.

Water umbel populations under a winter grazing regime were relatively stable from 1989 to 1995 in Bear and Scotia Canyons (Falk 1998), thus with the additional restrictions, the Service believes the proposed action should allow for at least maintenance if not enhancement of water umbel populations and an initiation of recovery of structural damage (incision, head cuts) to stream channels. However, because of the uncertainty regarding the causes of observed habitat degradation and the effects of proposed treatments, monitoring will be essential to gauge the success of these changes. As a result, the Forest has committed to monitor all populations of Huachuca water umbel on Forest lands on the Lone Mountain allotment. The Service believes the results of the monitoring will be essential in judging the effectiveness of these treatments in meeting the goals of maintenance or enhancement of populations and recovery of habitats. Having areas under different treatments (exclosures, winter grazing from December to March, and winter grazing with limitations on grass stubble height, streambank alteration, and drought restrictions) will provide needed information about the effects of different grazing strategies that will allow better analysis of the effects of grazing regimes. For instance, will total exclusion of livestock in some reaches with low levels of disturbance lead to increased cover by other wetland plants that may crowd out water umbel? Monitoring of water umbel populations under these various grazing scenarios will answer this and other questions.

The proposed action includes 12 planned improvements, including the pasture fences and exclosures discussed above, other pasture and boundary fences, replacement and burial of 3.2 km (2 mi) of pipeline, reconstruction of a well and the Peterson pond, both of which are in Scotia Canyon, the airpost mill waterlot, and the Eighty Pasture trap. Only the exclosures in Lone Mountain and Scotia canyons, the well, pond reconstruction, and pipeline in Scotia Canyon would affect the water umbel. Other improvements are found outside water umbel habitat. As discussed, the exclosures would remove grazing in Lone Mountain Canyon and remove cattle in lower Scotia Canyon for at least five years, which are expected to benefit the water umbel. The well construction in Scotia Canyon may entail replacement of the windmill in lower Scotia Canyon with a solar-powered pump, or other possible options. The windmill is next to water umbel habitat in the canyon bottom. Careful project design should eliminate or reduce any potential adverse effects from the project. The proposed pipeline would probably tap into an existing pipeline and take water upslope away from the canyon bottom in Scotia Canyon, but precise location of the project is yet to be determined. With careful design, the project should affect water umbel minimally or not at all. The Coronado has agreed to develop mitigation plans for the well and pipeline projects. If the Service concurs with the mitigation plans and believes that the projects, mitigation, and effects of the actions fall within the scope of that just described, then this biological opinion will cover those projects and no further consultation will be necessary. The Peterson pond reconstruction is a project that could have varying effects on the water umbel and its habitat depending on the nature of the project, which is as yet uncertain. This opinion does not cover the Peterson pond project.

Manilla Allotment

As described in the environmental baseline, water umbel was found in 1997 at a creek crossing of Cimarron Road. Because of sedimentation and other alteration of habitat during construction activities in 1998, the water umbel was apparently extirpated or could not be found. Upstream water diversion may have contributed to the extirpation (Jeanne Wade, Coronado National Forest, pers. comm., 1999). Water umbel reportedly occurs upstream of the site on private lands, and could potentially recolonize the area disturbed by road construction. The USFS (1998a) found that "the site was trampled by livestock when we visited it, the deergrass had >45 percent utilization." Thus, grazing probably was slowing recolonization and recovery of the habitat. The noted utilization of deergrass is greater than the maximum allowable (45 percent) on the allotment (USFS 1998c). However, several unauthorized roads also lead into the spring area, and habitat has been degraded because of off-road vehicles and cattle (February 2, 1999 letter from the Sierra Vista District Ranger to "Interested Parties").

Range condition is mostly moderately low (35 percent) to low (45 percent), with static trends. Soils are largely (75 percent) in unsatisfactory condition. These conditions suggest degraded watershed condition which may result in higher peak flows, lower low flows, and high sedimentation and erosion in stream channels, all of which are detrimental to water umbel habitat, as described above. As part of the analysis for issuance of a 10-year permit, the Forest proposes an exclosure for approximately 480 by 320 m (300 by 200 ft) of the drainage, which includes most of the area where the water umbel occurs. The Forest began scoping on the proposal with the above cited February 2, 1999, letter. The exclosure should result in recovery of the habitat and a greater likelihood that the site will be successfully recolonized by the water umbel population. Degraded watershed condition may hamper recovery outside the exclosure; however, a planned division fence and water development in the Center Pasture should ease better management of cattle in the channel where the water umbel occurs. These planned improvements are likely to benefit the water umbel.

Papago Allotment

The Forest requested a concurrence with a determination that the proposed action would not be likely to adversely affect the water umbel in the Papago allotment. However, because of degraded range and soil conditions, the Service and the Forest agreed to address this allotment in formal consultation. The two sites on this allotment where the water umbel is found are within exclosures where grazing has been excluded. The O'Donnell creek exclosure was constructed in 1996; the site at Freeman Spring is within a pasture that has had livestock excluded since 1998. Cattle will remain out of that pasture until an exclosure can be constructed around the water umbel population. Before taking cattle out of the pasture, utilization exceeded 70 percent at the spring, deergrass had stubble heights of 5 to 8 cm (2-3 in), and the spring was "trampled with hardly any vegetation growth on the banks" (USFS 1998c). Range condition in this and the adjacent Z-triangle allotment is moderately low with a downward trend. An estimated 80 percent of the allotment exhibits soils in unsatisfactory condition. Range condition and trend, as well as soil condition suggests degraded to highly degraded watershed conditions, which may result in higher peak flows, lower low flows, and high sedimentation and erosion in stream channels, all of which are detrimental to water umbel habitat, as described above. Despite degraded watersheds, the new exclosures are expected to result in improvement of water umbel habitat.

Mima Falk (pers. comm., 1999) reports dramatic recovery of vegetation communities within the O'Donnell Creek exclosure.

The only proposed range improvement projects in the Papago allotment that may affect the water umbel are the construction of the exclosure fence at Freeman Spring and development of a proposed well and pipeline that would carry water from the Freeman Springs area to two pastures on the Z-Triangle allotment (the Z-Triangle and Papago allotments are operated as one). Construction of the exclosure fence at Freeman Spring will include a gate or gates to allow removal of cattle if cattle gain unauthorized entrance to the exclosure. The spring has been used as a water source and stop over by recreational horseback riders in the past, with occasional heavy use and trampling of water umbel. The gate or gates will be in remote portions of the exclosure fence and will be wired shut so that they should not simplify entry by recreationists. This should largely eliminate effects of both cattle grazing and trampling by horses. Construction of the fence itself could potentially result in some minor disturbance or trampling of water umbel and its habitat where the fence crosses the stream, but effects are anticipated to be insignificant and temporary. The proposed well site is approximately 150 linear meters (500 ft) from and 23 vertical meters (75 ft) above Freeman Spring. Construction would not occur in or next to water umbel habitat. Given relatively low water needs and the distance from the well to the spring, operation of the well is not anticipated to affect the flow of Freeman Springs (July 15, 1999, letter from Robert Lefevre, Coronado National Forest Watershed Program Manager and hydrologist to District Ranger, Sierra Vista Ranger District); and thus should not affect water umbel or its habitat.

Effects to Critical Habitat

The Forest requested conferencing on effects of the proposed action on proposed critical habitat for the water umbel in their April 2 letter to this office. Critical habitat was finalized in a July 12, 1999, Federal Register notice. Upon designation, the conference becomes a consultation. Within Coronado National Forest allotments, critical habitat for the Huachuca water umbel was designated only on the Lone Mountain allotment in the following areas: Scotia Canyon [5.4 km (3.4 mi)], Sunnyside Canyon [1.1 km (0.7 mi)], Bear Canyon [1.6 km (1.0 mi)] and an unnamed tributary to Bear Canyon [0.9 km (0.6 mi)], Lone Mountain Canyon [1.6 km (1.0 mi)] and associated tributaries including "Rattlesnake Canyon" [1.6 km (1.0 mi)] and an unnamed tributary [1.0 km (0.6 mi)]; which totals 13.2 km (8.3 mi), or 16 percent of the total stream/river miles designated as critical habitat. Upon designation, the conference becomes a consultation. Within Coronado National Forest allotments, critical habitat for the Huachuca water umbel was designated only on the Lone Mountain allotment in the following areas: Scotia Canyon [5.4 km (3.4 mi)], Sunnyside Canyon [1.1 km (0.7 mi)], Bear Canyon [1.6 km (1.0 mi)] and an unnamed tributary to Bear Canyon [0.9 km (0.6 mi)], Lone Mountain Canyon [1.6 km (1.0 mi)] and associated tributaries including "Rattlesnake Canyon" [1.6 km (1.0 mi)] and an unnamed tributary [1.0 km (0.6 mi)]; which totals 13.2 km (8.3 mi), or 16 percent of the total stream/river miles designated as critical habitat. The only large reach of umbel habitat is on the upper San Pedro River, where 54.2 km (33.7 mi) were designated as critical habitat. Total stream miles of critical habitat under various grazing regimes are shown in Table 19.

Effects analyses must determine if the proposed action would destroy or adversely modify critical habitat. "Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical (50 CFR 402.02). The primary constituent elements identified in the final rule (USFWS 1999b) as necessary for the survival and recovery of the Huachuca water umbel include, but are not limited to, the habitat components which provide the following:

(1) Sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of Huachuca water umbel;

(2) A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for water umbel expansion;

(3) A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for water umbel growth and reproduction; and

(4) In streams and rivers, refugial sites in each watershed and in each reach, including but not limited to springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

As discussed previously, grazing can adversely affect constituent elements. Alteration of the watershed can result in destabilized channels with higher high flows and lower low flows (Gifford and Hawkins 1978, Blackburn 1984, DeBano and Schmidt 1989), possibly scouring water umbel habitats or drying them out (constituent elements 1 and 2). Cattle grazing can promote establishment of nonnative plants in riparian systems (constituent element 3) (Stromberg and Chew 1997). As described, field trips to the Lone Mountain area in March 1999, an extraordinarily dry spring, revealed concentrations of cattle and severe impacts to plant communities and channel morphology in the last few wetted places; these places are also critical refugia for water umbel during drought (constituent element 4). However, while, cattle can play a role in producing open microsites for water umbel expansion (constituent element 2).

Table 19. Proposed grazing strategies in Huachuca water umbel designated critical habitat on the Coronado National Forest.

Stream	No Grazing	Limited Winter Grazing
Bear Canyon and tributary	1.2 km	1.3 km[1]

Lone Mountain Canyon and tributaries	0.1 km	4.0 km^2
Scotia Canyon	2.8 km	2.65 km^2
Sunnyside Canyon	-	0.6 km^2

[1] Grazing in winter when riparian trees are dormant, and when cattle leave the area average stubble heights on deergrass in the wetted stream bottoms will not be less than 25-33 cm and streambank alteration will not exceed 10 percent. The Bear Pasture will be rested until deergrass biomass increases to a point that it is somewhat resistant to grazing (perhaps 2 growing seasons).
[2] Grazing from December through March, but only in winters when rainfall is sufficient to provide adequate water for cattle dispersal away from the canyon bottom. When cattle leave the area average stubble heights on deergrass in the wetted stream bottoms will be at least 25-33 cm and streambank alteration will not exceed 10 percent.

As discussed, and as witnessed with relatively good range condition and an upward trend, upland watershed degradation on the Lone Mountain allotment does not appear to be a problem as a result of grazing. Water umbel populations in Scotia and Bear Canyons were relatively stable from 1989-1995 under a regime of winter grazing. With additional restrictions as proposed, the Service expects recovery of plant communities, a slow recovery of channel morphology (rebuilding of banks, reversal of channel incision and head cuts), and maintenance or enhancement of water umbel populations.

Plants are probably most affected by grazing during the growing season, which will not occur in critical habitat. Streambank damage is probably most extreme during the driest periods and seasons when cattle are concentrated in wetted areas. Cattle will not be in critical habitat during the driest season (May and June), and in the Scotia, Sunnyside, and Lone Mountain canyon areas, cattle will not be present in winters in which precipitation is not adequate for cattle dispersal away from the canyon bottoms. Where winter grazing occurs, limits on streambank alteration and deergrass stubble height will minimize grazing effects.

Although the Service predicts recovery of habitats and enhancement of water umbel populations, careful monitoring will be necessary to ensure recovery. The Forest has committed to monitoring water umbel populations on Forest lands. Populations within critical habitat are proposed to be monitored every other year following the current protocol (Falk 1998). Based on the results of that monitoring, adjustments to cattle management may be needed to provide for long-term maintenance of water umbel populations and constituent elements of critical habitat.

The only proposed range projects covered by this opinion that may affect critical habitat are the exclosures in Lone Mountain and Scotia canyons, and the well, pond reconstruction, and pipeline in Scotia Canyon. As discussed above, the exclosures are expected to benefit water umbel habitat, and effects resulting from the well, pond, and pipeline projects are expected to be minimal or none. The Coronado has agreed to develop mitigation plans in coordination with the Service for these projects to reduce effects to the water umbel.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, or local private actions that are reasonably certain to occur in the project area. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Effects of past Federal and private actions are considered in the Environmental Baseline. Because of the extent of Federal lands in the project area, few non-Federal activities are expected occur. Exceptions include grazing activities on inholdings of the Lone Mountain ranch, and activities on private lands at the historic townsite of Sunnyside and at other scattered private parcels. No State lands are known to occur in the project area.

Conclusion

After reviewing the current status of the Huachuca water umbel, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Huachuca water umbel. Furthermore, the proposed action is not likely to result in adverse modification and destruction of critical habitat. We present these conclusions for the following reasons:

1) The Forest proposes several mitigating measures and modifications to grazing strategies that reduce effects of grazing activities on the water umbel and its habitat.

2) All water umbel sites would either not be grazed or be grazed only in winter. Populations in Scotia and Bear canyons were relatively stable from 1989-1995 under a winter grazing strategy. Additional measures would be implemented in Scotia, Bear, and other canyons to ensure maintenance or enhancement of populations and habitat.

3) The Forest proposes monitoring of water umbel populations and grazing effects to ensure those grazing prescriptions are being implemented and to document effects to the umbel. If effects to the umbel are not as predicted herein, the Forest has agreed to discuss the need for further changes to grazing strategies.

Note that in regard to “take” of listed species in sections 7(b)(4) and 7(o)(2) of the Act, these sections generally do not apply to listed plant species, thus no incidental take statement is included here for the Huachuca water umbel. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of Federally listed endangered plants and malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or during any violation of a State criminal trespass law.

If monitoring reveals that habitats and water umbel populations are not responding as predicted in the effects analysis herein, the Forest should consider this new information suggesting the effects of the action are affecting the species or critical habitat in a manner or to an extent not previously considered, and in accordance with 50 CFR 402.16, consultation should be reinitiated.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the Huachuca water umbel. In furtherance of the purposes of the Act, we recommend the following discretionary actions:

1. The Forest could provide assistance to the Service in developing a recovery plan for the Huachuca water umbel.

2. The Forest could continue planning for the Lone Mountain prescribed fire, which should promote reduction of fuels in the watershed in the Lone Mountain allotment, reducing the chances of catastrophic fire and watershed degradation.

3. The Forest could fund additional surveys for the water umbel on Forest lands, and support research on the ecology of the species, and land use history and changes in vegetation communities and ecological conditions in the Huachuca Mountains.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species, the Service requests notification of implementation of any conservation actions.

GILA TOPMINNOW (*Poeciliopsis occidentalis occidentalis*)

Status of the Species

Gila topminnow belongs to a group of live-bearing fishes within the family Poeciliidae that includes the familiar guppy (*Poecilia reticulata*), which is not native to the Gila basin. Males are smaller than females, rarely greater than 25 mm (1 in), while females are larger, reaching 51 mm (2 in). Body coloration is tan to olivaceous, darker above, lighter below, often white on the belly. Breeding males are usually blackened, with some golden coloration of the midline, and with orange or yellow at base of the dorsal fin.

Fertilization is internal, and sperm packets are stored which may fertilize subsequent broods. The brood development time is 24 to 28 days. Two to 3 broods in different stages develop simultaneously in a process known as superfetation. Gila topminnow gives birth to 1 to 31 young per brood (Schoenherr 1974). Larger females produce more offspring (Minckley 1973). Gila topminnow matures a few weeks to many months after birth, depending on when they are born. It breeds primarily from March to August, but some pregnant females occur throughout the year (Schoenherr 1974). Some young are produced in the winter months. Minckley (1973) and Constantz (1980) reported that Gila topminnow are opportunistic feeders which eat bottom debris, vegetation, amphipods, and insect larvae when available.

Gila topminnow and many other Poeciliids can tolerate a variety of physical and chemical conditions. They are good colonizers in part because of this tolerance and in part because a single gravid female can start a population (Meffe and Snelson 1989). Minckley (1969a, 1973) described their habitat as edges of shallow aquatic habitats, especially where abundant aquatic vegetation exists. Simms and Simms (1991) found the densities of Gila topminnow in Cienega Creek, Pima County, Arizona, to be greater in pool, glide, and backwater habitats and less dense in marsh, riffle, chute, cascade, and fall habitats. They occurred more frequently over sand substrates than over other categories of substrates. Although Gila topminnow may occupy pools and ponds that are up to 2 m (6 ft) deep, they are normally found in the upper one-third of the water column (Forrest 1992).

Gila topminnow is known to occur in streams fluctuating from 6 to 37ºC (51-99º F), pH from 6.6 to 8.9, dissolved oxygen levels of 2.2 to 11 mg/l (2.2-11 ppm), and can tolerate salinities approaching those of sea-water (Meffe et al. 1983). Topminnow can burrow under mud or aquatic vegetation when water levels decline (Deacon and Minckley 1974, Meffe et al. 1983). Sonoran topminnow (including both Gila and Yaqui subspecies) regularly inhabit springheads with high loads of dissolved carbonates and low pH (Minckley et al. 1977, Meffe 1983, Meffe and Snelson 1989). This factor has helped protect small populations of topminnow from western mosquitofish (*Gambusia affinis*) that are usually rare or absent under these conditions (Meffe 1983).

Gila topminnow was listed as endangered in 1967 without critical habitat (USFWS 1967). Only Gila topminnow populations in the United States, and not in Mexico, are listed under the ESA. The reasons for decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonnative fishes (Miller 1961, Minckley 1985). Other listed fish suffer from the same impacts (Moyle and Williams 1990).

Gila topminnow are highly vulnerable to adverse effects from nonnative aquatic species (Johnson and Hubbs 1989). Predation and competition from nonnative fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe et al. 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997). The native fish fauna of the Gila basin and of the Colorado basin in general, was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). In the riverine backwater and side-channel habitats that formed the bulk of Gila topminnow natural habitat, predation and competition from other fishes was essentially absent. Thus Gila topminnow did not evolve mechanisms for protection against predation or competition and is predator- and competitor-naive. With the introduction of large numbers of predatory and competitive nonnative fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1986) and small (Meffe et al. 1983) nonnative fish cause problems for Gila topminnow as can nonnative crayfish (Fernandez and Rosen 1996) and bullfrogs.

Gila topminnow was listed in 1967 as *Poeciliopsis occidentalis*. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969a, 1973). *P. o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis*, including both subspecies, is collectively known as the Sonoran topminnow. Both subspecies are protected under the ESA.

Historically, the Gila topminnow was abundant in the Gila River drainage and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). This was reduced to only 15 naturally occurring populations. Presently, only 12 of the 15 recent natural Gila topminnow populations are considered extant (Table 20) (Weedman and Young 1997). Only three (Cienega Creek, Monkey Spring, Cottonwood Spring) have no nonnative fish present and therefore can be considered secure from nonnative fish threats. There have been at least 175 wild sites stocked with Gila topminnow, however, topminnow persist at only 18 of these localities. Of the 18, one site is outside topminnow historic range and four now contain nonnative fish (Weedman and Young 1997). The Sonoran Topminnow Recovery Plan (USFWS 1984b) established criteria for down- and de-listing. Criteria for down-listing were met for a short period. However, due to concerns regarding the status of several populations, down-listing was delayed. Subsequently, the number of reintroduced populations dropped below that required for down-listing, where it has remained. The Yaqui topminnow is now included within the Yaqui Fishes Recovery Plan (USFWS 1995c).

Table 20. Status of natural Gila topminnow populations in the US.

Site	Ownership	Extant?[1]	nonnatives?	Mosquitofish?	Habitat Size[2]	Threats[3]
Bylas Spring[5]	San Carlos	YES	YES	YES	S D	M, N G
Cienega Creek	BLM	YES	NO	NO	L	M, R N
Cocio Wash	BLM	NO 1982	UNKNOWN	UNKNOWN	S	H, M
Cottonwood Spring	Private	YES	NO	NO	S	M, N
Fresno Canyon	State Parks	YES	YES	NO[4]	M	H, N G U
Middle Spring[5]	San Carlos	YES	YES	YES	S	H, N G
Monkey Spring	Private	YES	NO	NO	S	L, W U
Redrock Canyon	USFS	YES	YES	YES	M D	H, W R G N
Sabino Canyon	USFS	NO 1943	YES	NO	M	H, R N
Salt Creek[5]	San Carlos	YES	NO[4]	NO[4]	S	M, N G
San Pedro River	Private	NO 1976	YES	YES	-	H, W N G R
Santa Cruz River San Rafael Tumacacori Tucson	Private	 YES[6] YES NO 1943	 YES[4] YES	 YES	L D	H, W N R G C U
Sharp Spring	Private	YES	YES	YES	M	H, N G U
Sheehy Spring	Private	NO 1987	YES	YES	S	H, N G U
Sonoita Creek	Private, TNC, State Parks	YES	YES	YES	L D	H, W N G
Tonto Creek	Private	NO 1941	YES	YES	L	H, N R G W

[1] if no, last year recorded
[2] L = large M= medium S = small D = disjunct
[3] Immediacy H = high M = moderate L = low
Type W = water withdrawal C = contaminants R = recreation N = nonnatives G = grazing M = mining U = urbanization
[4] none recently, they have been recorded
[5] recently renovated
[6] in Mexico, US in 1993

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at not more than 30 localities (12 natural and 18 stocked). Many of these localities are small and highly threatened. The theory of island biogeography can be applied to these isolated habitat remnants, as they function similarly (Meffe 1983, Laurenson and Hocutt 1985). Species on islands are more prone to extinctions than continental areas that are similar in size (MacArthur and Wilson 1967). Meffe (1983) considered extinction of Gila topminnow populations almost as critical as recognized species extinctions and Moyle and Williams (1990) noted that fish in California that are in trouble tend to be endemic, restricted to a small area, part of fish communities with fewer than five species, and found in isolated springs or streams. Gila topminnow has most of these characteristics.

The highest priority actions in the draft revised Gila topminnow recovery plan are essential to prevent extinction in the foreseeable future (Weedman 1998). Federal actions have contributed to the degraded environmental baseline of the Gila topminnow. Federal actions requiring section 7 consultations affecting Redrock Canyon, Cienega Creek, Sonoita, the Santa Cruz River, and others in the Gila River basin have contributed to the lowered baseline. An indication of the poor environmental baseline of the Gila topminnow is that two previous formal consultations have resulted in jeopardy opinions. Although the reasonable and prudent alternatives remove jeopardy, not all adverse effects are removed by implementation of the reasonable and prudent alternatives. Other Federal actions, as well as non-federal actions that have not undergone section 7 consultation, also have unmitigated adverse effects that contribute to the degraded baseline.

Environmental Baseline

In addition to the general environmental baseline described earlier in this biological opinion, the environmental baseline in Redrock Canyon and Sonoita and Cienega Creeks is important in considering the effects of the proposed livestock grazing on Gila topminnow. The portion of the proposed action that may affect Gila topminnow is the continued authorization of livestock grazing and management, at present levels and under existing systems, for three years on the Seibold, Kunde, Crittenden, and Papago allotments and for the remaining 6 years of the 10-year grazing permit on the San Rafael allotment. These allotments encompass all of Redrock Canyon and parts of the watersheds of Sonoita Creek and Cienega Creek, all of which support remnant natural populations of Gila topminnow.

Fence and water development construction and maintenance and other physical range projects are not included in this consultation on Gila topminnow. Although some projects were mention-ed in the BE and in comments on the draft biological opinion, the information on location, configuration, and use were not sufficient for adequate analysis of their potential effects to Gila topminnow. These improvements should be the subject of further section 7 analysis. Future section 7 analysis of range improvements should consider the cumulative or aggregative effects of all range improvements as well as considering them from the baseline formed by this consultation.

Table 21 shows the specifics of the presently proposed grazing management compared to that proposed in 1990 under the Redrock Action Plan, for which previous section 7 consultation was conducted on the Seibold, Kunde, and Redrock Canyon portion of the San Rafael allotments. Implementation of the Action Plan began in 1990 and is ongoing. Also shown are known changes in permitted numbers and management after the Redrock Action Plan and prior to this

Table 21. Specifications[1] for allotments affecting Gila topminnow in Redrock Canyon, Coronado National Forest - 1990 Redrock Action Plan compared to 1999 Proposed Action and changes made between 1990 and 1999.

	SEIBOLD ALLOTMENT			CRITTTENDEN ALLOTMENT		KUNDE ALLOTMENT			SAN RAFAEL ALLOTMENT			PAPAGO/Z TRIANGLE ALLOTMENT	
	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Acton	1990[2]	1999
acreage	3,040		3,145	9,800	10,083	3,698		4,199	22,295		22,220	10,300	13,540
capable acres	2,806		2,971	8,670	7,207	3,238		3,300	19,331		21,446	8,400	13,380
livestock class	cattle		cow/calf	cattle	cow/calf	cattle (horse)	horses dropped from permit in 1998[3]	cow/calf	cattle		cow/calf	cattle (horse)	cow/calf (horse)
permitted head	100 (25 nonuse)	reduced to 50 in 1995[3]	50 total of 215 from combined Seibold and Crittenden may be present	165	165 total of 215 from combined Seibold and Crittenden may be present	53(3)		53	700	reduced to 475 in 1995	475	400(5)	400(5)
projected use	50-75		50	ND	165	53(3)	3-yr non-use agmt. beginning summer 1998[3]	53	700		475	400(5)	253(5)
animal months	900 200-300 in upper and lower Redrock (now West and East Redrock) pastures	reduced to 122 in upper and lower Redrock pastures in 1998[3]	600	1,980	1,980	672		645	8,400		5,780	4,860	3,102

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	SEIBOLD ALLOTMENT			CRITTTENDEN ALLOTMENT		KUNDE ALLOTMENT			SAN RAFAEL ALLOTMENT			PAPAGO/Z TRIANGLE ALLOTMENT	
	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Acton	1990[2]	1999
acres/animal month	3.1		5.0	ND	3.6 (with Seibold)	4.8		5.1	2.3		3.7	1.7	4.3
Production/ Utilization studies	39 head year-long		ND	167 head yearlong	ND	53 head yearlong		ND	ND in 1990, 475 head yearlong in 1994		ND	ND	ND
season of use	yearlong		March 1 to Feb. 28 (12 months)	yearlong	March 1 to Feb. 28 (12 months)	yearlong		March 1 to Feb. 28 (12 months)	yearlong		March 1 to Feb. 28 (12 months) for entire allotment	yearlong	March 1 to Feb. 28 (12 months)
maximum utilization upland	55%		45%	55%	45%	55%		45%	55% - Adjusted in 1995 to 45%		45%	55%	45%
maximum utilization riparian	ND		ND	ND	ND	ND		ND	ND	In 1995 - 20% on seedlings- 50% on annual stem production of browse	ND	ND	ND
management system	deferred rotation		rest rotation	deferred rest rotation	rest rotation	deferred rotation		deferred rotation	ND		deferred rest rotation	deferred rotation	deferred rest rotation
pastures	4		6 (with Crittenden)	3	6 (with Seibold)	3		3	16		23 (6 herds)	13	14
special use pastures	0		0	0	1	1 holding	small holding pasture added[3]	2 holding (1 labeled horse on map)	ND		ND	ND	1 horse

Table 21. Specifications[1] for allotments affecting Gila topminnow in Redrock Canyon, Coronado National Forest - 1990 Redrock Action Plan compared to 1999 Proposed Action and changes made between 1990 and 1999.

	SEIBOLD ALLOTMENT			CRITTTENDEN ALLOTMENT		KUNDE ALLOTMENT			SAN RAFAEL ALLOTMENT			PAPAGO/Z TRIANGLE ALLOTMENT	
	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Acton	1990[2]	1999
exclosures	1		1	ND	1	2		2	2 (only 1 in Redrock drainage)		2 (only 1 in Redrock drainage)	ND	2 (in San Pedro drainage
pattern of pasture use	lower & upper Redrock (now West & East Redrock) pastures - Nov - March; West & East (now Moonshine & Oak Grove) pastures - April - Oct.; moves governed by date.	no change	West & East Redrock pastures - dormant season only; Moonshine & Oak Grove pastures - any time of year in rotation with 5 other pastures, rest every other growing season; moves governed by water & forage availability, utilization, & rest	Kunde (now Red Bear) pasture - fall-spring; other pastures - ND	Red Bear & Corral pastures - any time of year in rotation with 5 other pastures, rest every other growing season; Crittenden pasture - heifers only, drought reserve, or special purposes; moves governed by water & forage availability, utilization, & rest	Redrock pasture - Nov-Feb.; Kunde (now upper Lampshire) pasture - Mar-June; Middle (now lower Lampshire) pasture - July-Oct.; moves governed by dates	no change	Redrock Pasture - total growing season rest; upper Lampshire & lower Lampshire pastures - growing seasons rest every other year; moves governed by water & forage availability, utilization, & rest	450-500 head in Redrock pasture Nov-Feb. 450-500 in New pasture March-April	Reduced in 1995 to 200 head for 2 months each pasture Oct.-Jan.[4] Increased in 1995 to Oct-Feb. with 4.5 months use in North Redrock (=Redrock) pasture and 2.5 months in South Redrock (=New) pasture[5]	Redrock pasture - 200 head for 4.5 months in Oct.-Feb. New pasture - 200 head for 2.5 months in March-May other pastures - growing season rest at least every other year & some every year; moves governed by water & forage availability, utilization, & rest	Lampshire pasture fall-spring; other pastures - ND	Every pasture - partial growing season rest every year; cattle scattered in several pastures in dormant season & consolidated in growing season for fast moves; moves governed by water & forage availability, utilization, & rest

Table 21. Specifications[1] for allotments affecting Gila topminnow in Redrock Canyon, Coronado National Forest - 1990 Redrock Action Plan compared to 1999 Proposed Action and changes made between 1990 and 1999.

	SEIBOLD ALLOTMENT			CRITTTENDEN ALLOTMENT		KUNDE ALLOTMENT			SAN RAFAEL ALLOTMENT			PAPAGO/Z TRIANGLE ALLOTMENT	
	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Action	1990 Redrock Action Plan	1990-1999 changes	1999 Proposed Acton	1990[2]	1999
range condition	poor-very poor riparian unsatisfac-tory		moderately low	ND	moderately low	poor-very poor riparian unsatisfac-tory		moderately low	poor-very poor riparian unsatisfac-tory		30% low 70% moderately low	ND	moderately low
range trend	ND		70% static 30% down	ND	99% static 1% down	ND		85% static 15% down	ND		0.1% static 99.9% down	ND	1% static 99% down
soil condition	ND		19% satisfactory 80% unsatisfac-tory 1% unsuited	ND	51% satisfactory 39% unsatisfac-tory 1% unsuited	ND		53% satisfactory 41% unsatisfac-tory 6% unsuited	ND		15% satisfactory 52% impaired 32% unsatisfac-tory 1% unsuited	ND	17% satisfactory 82% unsatisfac-tory 1% unsuited
watershed condition	ND		ND	ND	ND	ND		ND	ND		unsatisfac-tory overall and for riparian	ND	

[1] All specifications are from documents furnished by the Forest Service or from personal communication with Forest Service staff.
[2] 1990 figures are for Papago allotment only.
[3] Changes in grazing stocking rate and management were only reductions in use and not changes in management and did not undergo section 7 consultation.
[4] This is the management scenario on which a 1995 informal section 7 concurrence was based.
[5] This is the management scenario that was actually implemented in 1995 and which is being continued in the proposed action.

ND = no data

proposed action. A map of pasture locations is shown in Figure 14. Information on grazing prior to the 1990 Redrock Action Plan, as provided in comments on the draft biological opinion, is not included in Table 21 because it is only partial. Although a complete history of the grazing intensity and management on the five allotments being considered here would be useful in fully understanding the environmental baseline, complete information is not available. As pointed out in Forest Service and permittee comments, it is important to recognize that although historic grazing practices may have had significant adverse impacts to the stream channel of Redrock Canyon and contributed to the present deteriorated environmental baseline, current stocking numbers are substantially lower and grazing practices are more intense and controlled.

In addition, information furnished in comments on the draft biological opinion regarding voluntary and temporary reductions in head number, pasture use, etc., are not included as part of the proposed action under analysis, although they may be mentioned as factors in the environmental baseline. The proposed action includes the number or range of various elements as specified in the present permit, whether or not those numbers or usages are presently occurring. The analysis considers that use may occur at lower permitted numbers and with shorter pasture usages, but does not consider higher than permitted numbers or longer pasture usages. Forest Service and permittee comments on the identity of the permittees and the quality of their grazing management performance relative to that of earlier permittees is also not considered as part of the proposed action. The proposed action is the permit terms and a basic underlying assumption of this consultation is that the Forest Service will ensure that those terms are completely and successfully implemented, regardless of the permittee.

Cienega Creek is a tributary of the Santa Cruz River, entering it through the Pantano Wash complex at the city of Tucson in Pima County. A large portion of Cienega Creek is located within the Bureau of Land Management's (BLM) Empire-Cienega Resource Conservation Area and this area contains most of the Gila topminnow within the Cienega Creek basin. The BLM acquired this area from private ownership in 1988. The "headwaters" of perennial flow in Cienega Creek begin on the Conservation Area, approximately 16 km (10 mi) downstream from where the channel leaves the Papago allotment. A number of human activities are allowed along this portion of Cienega Creek, including livestock grazing, recreation, and roads. Prior to BLM acquisition of the area, it was primarily used for grazing, but there were also extensive fields along the creek. These fields were irrigated by a system of canals and dams that locally destroyed Gila topminnow habitat and created severe erosion. The BLM is gradually removing these developments and has reconstructed a portion of the creek to restore more natural geomorphic and hydrologic conditions.

Above BLM land on Cienega Creek, the valley is mostly used for livestock grazing. However, there is extensive proliferation of ranchette development in the area surrounding the town of Sonoita. This growth is based on groundwater use, which may threaten the water supply for Cienega Creek.

Redrock Canyon is tributary to the middle reach of Sonoita Creek, which is tributary to the Santa Cruz River. The confluence of Redrock Canyon and Sonoita Creek is at the town of Patagonia in Santa Cruz County. Redrock Canyon is a wide, relatively complex drainage lying between the

Canelo Hills to the north and the Patagonia Mountains to the south. Major tributaries include Harshaw, Lampshire, and Oak Grove Spring Canyons and Cott Tank drainage. Because Harshaw Canyon is not within the allotments being considered here and enters Redrock Canyon only a short way above the confluence with Sonoita Creek, we will not consider it further in this analysis. The remainder of the Redrock Canyon watershed is within the action area. Elevation of the stream channel in Redrock Canyon varies from 1,240 m (4,070 ft) to 1,524 m (5,000 ft). Surface flow in Redrock Canyon is perennial interrupted, with flow present in most parts of the canyon only during precipitation. There are several perennial springs in the drainage and several areas of perennial stream flow (Stefferud 1989, Stefferud and Stefferud 1994, Stefferud 1996). In addition to the springs, the primary areas of perennial flow are located in Cott Tank drainage and Redrock Canyon at its confluence with Cott Tank drainage, at Gate Spring, and at the falls area (also referred to as "below Redrock Ranch"). A fourth area of perennial or near-perennial flow is located in about 1.2 km (0.75 mi) upstream from the Forest boundary.

Although the Biological Assessment for this action shows no dry desert, deciduous, evergreen, or coniferous riparian within four of the five allotments, riparian vegetation is found along most of the length of Redrock Canyon itself and in scattered patches along all of the major tributaries and at the springs. All of this riparian vegetation has been heavily impacted by human activities.

Sonoita Creek is a major tributary to the Santa Cruz River, joining it near the town of Rio Rico. The proposed livestock may affect only the middle to upper reaches of Sonoita Creek above Patagonia Lake grazing on the five allotments being considered here. Middle and upper Sonoita Creek drain the western slope of the Canelo Hills, the northwestern toe of the Patagonia Mountains, and the southeastern slope of the Santa Rita Mountains. Major tributaries of Sonoita Creek that may be affected include Alamo, Monkey, Dark, Corral, and Redrock Canyons. Tributaries from the Santa Rita Mountains may be found in other Forest Service livestock grazing allotments which we address in the appendix of this biological opinion. Above Patagonia, Sonoita Creek lies in a moderately wide, flat valley, narrowing below Patagonia, but retains a low to moderate gradient and flat valley floor. Perennial surface flow is present only near Cottonwood Spring near the upper end and below the town of Patagonia, where sewage effluent augments surface flow. From there, the creek flows perennially to Patagonia Lake.

There are a number of accounts of human activities in the Sonoita Creek drainage area pre-1900. These early accounts indicate that substantial historic and prehistoric human use of the Sonoita Creek and Redrock Canyon area occurred and resulted in significant changes in the watershed and stream channel and degradation of the environmental baseline.

There were prehistoric settlements on Sonoita Creek and there are substantial archaeological sites in Redrock Canyon, including settlement sites and petroglyphs (USFS records). Dobyns (1981) asserts the Native Americans who resided in this area used fire extensively in hunting and warfare. Livestock grazing in the Sonoita Creek watershed likely began in the 1700's with Spanish settlement in the Santa Cruz valley, although it may not have extended as far afield from the Santa Cruz missions as Redrock Canyon. Mexican land grants were settled along mid-Sonoita Creek and in the San Rafael Valley, to the south of Redrock Canyon, by 1821 and large-scale cattle ranching was introduced (Wagoner 1975 as cited in Bahre 1991). Small scale mining was begun in the Patagonia mountains during Mexican occupation, such as at Harshaw Canyon, and there was extensive cutting of mesquite and oak for charcoal for the mines and other wood for domestic heating and cooking (Bahre 1991, Hadley and Sheridan 1995). Harshaw later became the largest and most long-lasting of the mining camps in the area (Hadley and Sheridan 1995). Small mining camps, such as La Plata and Jensen were settled within Redrock Canyon.

In 1857, Fort Buchanan was established on upper Sonoita Creek to protect a crucial travel route along the Sonoita Valley (Bahre 1991). Fort Buchanan was deserted at the outbreak of the civil war and replaced by Fort Crittenden in 1867 to protect farmers in the Sonoita Valley (Bahre 1991). By 1870, Fort Crittenden had a population of 215 people and the Sonoita Valley was one of the primary areas of irrigated agriculture in southern Arizona. A railroad from the San Pedro River to Guaymas, Sonora, Mexico via Sonoita Creek was completed in 1881 (Hastings and Turner 1980) which resulted in increased mining and cattle ranching activity in both the Cienega and Sonoita Creek watersheds, including Redrock Canyon. In addition to cattle, large numbers of sheep were grazed in the Sonoita Valley and watershed and the large Sonoita Creek ranches used the western slopes of the Canelo Hills, including Redrock Canyon, extensively for grazing (Bahre 1991, Hadley and Sheridan 1995). During the same time ranching was occurring just to the south in the San Rafael Valley. The San Rafael Cattle Company was established in 1882 and for two decades ran cattle throughout the San Rafael Valley and nearby areas including Redrock Canyon (Hadley and Sheridan 1995). In the 1915-16 period, several homesteaders attempted to dry farm on terraces along Redrock Canyon (Hadley and Sheridan 1995).

Livestock grazing in southern Arizona, including the Cienega and Sonoita watersheds reached its peak about 1891 (Bahre 1991). Severe drought between 1891 and 1893 led to decimation of the herds and the ranges. Accelerated downcutting of stream channels began in southern Arizona (Bryan 1925, Antevs 1952) and downcutting in Sonoita Creek probably occurred around 1890 (Minckley 1969b). A substantial flood in Sonoita Creek in the summer of 1886 followed by serious flooding in 1887 and 1890 appear to have been triggering events for the downcutting in upper Sonoita Creek and lower Redrock Canyon shown in 1895 photos in Hastings and Turner (1980). Later droughts in the 1920's and 30's were also associated with severe overgrazing in Sonoita Creek, Redrock Canyon, and the San Rafael Valley (Hadley and Sheridan 1995).

Vegetation changes within the Sonoita Creek watershed have been documented by a number of different studies including declines in grass, increases in woody xerophytes, expansion of exotic species, and decline in riparian wetlands (Hastings and Turner 1980, Hendrickson and Minckley 1984, Bahre 1991). The changes have been variously attributed to human activities, such as livestock grazing, fuelwood harvest, fire suppression, mining, and groundwater pumping, and to climatic change. Hastings and Turner (1980) show two photograph pairs from 1895 and 1965 of lower Redrock Canyon that show extensive change of grassland to mesquite in that period. This may represent a change away from prehistoric conditions or a regrowth of woody vegetation depleted by mining and other human activities.

"Prior to 1890, Sonoita Creek probably flowed through a broad marshy floodplain in multiple channels or by seepage" (Minckley 1969b). In 1854, the Bartlett party descended Sonoita Creek and described it as a swamp with grass growing head high and with Sonoita Creek closely hemmed in by an understory of willows with a gallery forest of giant cottonwoods (Davis 1986). The area between Fort Buchanan and Patagonia, including the mouth of Redrock Canyon, was a marsh or cienega (Hendrickson and Minckley 1984, Davis 1986) supporting a belief that lower Redrock Canyon was probably a perennial or semi-perennial stream with a higher bed than present. However, by 1895, as seen in the photographs in Hastings and Turner (1980) there was extensive downcutting along Sonoita Creek and the lower Redrock stream channel was already a wide, sandy, dry wash devoid of riparian vegetation. Though there is substantial information on the decline of stream channel and riparian conditions along Sonoita Creek, except for the lower reach shown in the Hastings and Turner photographs there is little or no available information on changes in the Redrock stream channel. However, given the information on draining and down-cutting in Sonoita Creek and lower Redrock Canyon, it is likely that perennial water was more extensive throughout the canyon and that the stream channel was narrower, less eroded, and more stable with a more complex aquatic habitat. Stream terraces, such as the one at Redrock Ranch, were also larger, stabler, and drier (Alice Kunde, pers. com., Oct. 1989). This would parallel the changes documented for upper and middle Sonoita Creek during the pre-1890 period.

The Sonoita Valley is now extensively modified for human use. Most of the valley bottom is occupied by towns, residences, or fields. Urban and suburban development is increasing. Several subdivisions have occurred and a recent subdivision, Rail X Ranch Estates, is being developed at the mouth of Corral Canyon. An exception to this is The Nature Conservancy Patagonia Preserve just downstream from the town of Patagonia.

At present, Redrock Canyon is subject to a number of human uses. Livestock grazing, roads, mining, fuelwood gathering, recreation, hunting, residential use, and water development have all influenced the character and condition of the watershed and stream channel.

Since establishment of the Coronado National Forest in the early 1900's there have been a number of efforts to control and manage livestock grazing within the Redrock and nearby watersheds and livestock numbers have been significantly reduced (see Hadley and Sheridan for a history of post-1900 ranching in the area). Within Redrock Canyon efforts have also been made to protect key riparian areas from adverse effects of livestock use. In the early 1980's an exclosure was constructed by the Forest Service around a small perennial area of stream surrounding the natural falls in the lower part of Redrock Canyon. However, by 1988 that exclosure was in disrepair and did not exclude livestock. By 1990, range condition and trend on the allotments within Redrock Canyon was poor to very poor and riparian conditions were unsatisfactory (see Table 21).

In 1990, the Forest Service began a management program called the Redrock Canyon Action Plan which resulted in three large and one small exclosures of perennial stream areas, winter grazing in the unexclosed portions of the channel of Redrock Canyon proper, and more carefully controlled grazing under deferred rotation. Pastures were added on three of the allotments and water developments were added. The purpose of these favorable changes was to "improve the vegetation conditions within the canyon, increase species and age class diversity of streamside vegetation, control erosion, and improve habitat for the Gila topminnow." These changes have been gradually applied over the past nine years so that the results are not yet fully realized. However, significant change in riparian vegetation and some stream channel improvement within the exclosures has occurred. However, range conditions on the allotments in Redrock Canyon remain poor to fair (low to moderately low, see March 30, 1999, memo Forest Service to Service)(Table 21). Forest Service information shows trends are mostly static on the Seibold, Crittenden, and Kunde allotments, and are overwhelmingly down on the San Rafael and Papago/ Z Triangle allotments. Soil conditions are mostly unsatisfactory or impaired. Riparian condition ratings are provided in the BE only for the San Rafael allotment where they are unsatisfactory.

Winter grazing on the unexclosed portions of the Redrock stream channel does not appear to have achieved the results predicted by the Action Plan. While a small amount of vegetation and transect data have been collected within the exclosures, as well as an annual series of photopoint monitoring (Wade 1995, Stefferud and Stefferud unpub. data), there are no data available outside the exclosures. Observations by Service staff during annual sampling of Gila topminnow populations in October-November indicate little or no change in riparian vegetation and stream bank and channel conditions and morphology outside the exclosures on the San Rafael and Kunde allotments over the nine years since the initiation of the Redrock Action Plan. Limited riparian vegetation improvement on the Seibold allotment has been noted. Additional information provided by the Forest Service as a result of their comments on the draft biological opinion indicate that a survey from Red Bank Well to Down Under Tank in March 1997 found improving riparian conditions, based primarily on the presence of large numbers of seedlings and saplings of woody riparian species (Deecken 1997), most of which apparently did not survive, based on Service staff observations in October 1998. Utilization levels on woody riparian ranged from 15 to 35 percent, compared to the 20 percent standard. Use on herbaceous riparian was 35 to 55 percent and adjacent uplands 25-60 percent, compared to the 45 percent standard. A December 1999 range inspection by the Forest Service also reports "the improvement in resource conditions is noteworthy" but provides no specific information, except to note that "use" in the Redrock Canyon bottom near Redbank Well was "less than 20%" and "herbivory"on riparian trees near Down Under Tank was 12 percent (midway through the scheduled grazing period with a standard of no more than 20 percent use) (Edwards 1999). On June 2, 1999, observations by a Service biologist from the bend below the site of the Old Silver Tank well upstream to the Cott Tank exclosure found one patch of localized sapling willows, a few scattered sapling willow and cottonwood, grasses on the streambanks cropped short, extensive cattle trailing on the stream channel and banks, and actively eroding banks in the non-bedrock areas (J. Stefferud 1999; S. Stefferud 1999). There was extensive utilization of this year's growth of willow and cottonwood. Cattle had been removed from the area in February, although unpermitted use had occurred more recently, with the out-of-season cattle removed upon discovery (L. Dupee, Coronado NF, pers. comm., July 7, 1999).

Without detailed information on actual use by both permitted and unpermitted livestock, it is not possible to accurately interpret the information on change, or lack of change, in stream channel and riparian vegetation conditions since initiation of the Redrock Action Plan. Comments from the Forest Service on the draft biological opinion provide several circumstances that may cause present conditions to not truly represent conditions that should have resulted from the Action Plan. The Forest Service states that previous permittees on the Seibold and Kunde allotment did not conform to permit specifications; Action Plan changes were done gradually and some fences and grazing systems were only put in place as recently as 1998; and water availability was overestimated in some places. Although these factors may legitimately explain why the purpose of the Action Plan is not being achieved, the fact remains that after nine years of efforts to stabilize and improve their status, the Gila topminnow in Redrock Canyon continue to be in serious condition. Since the major human influence on the watershed condition, hydrology, and stream channel of Redrock Canyon is livestock grazing and its management, continuation of essentially the same permitted livestock grazing and management, as proposed here, would not seem to promise sufficient and rapid enough improvement in the overall degraded range, riparian, and watershed conditions in Redrock Canyon to avoid ongoing adverse effects to Gila topminnow which inhibit their recovery and may compromise their survival. Comments by Arizona Game and Fish Department on the draft biological opinion agree with the Service that "In spite of considerable dollars that have been spent by the Forest to manage the area with consideration for the species, management is still inadequate to provide the necessary habitat attributes for long-term maintenance of the species" (AGFD 1999).

Although generally successful, the four exclosures have been breached several times and light to extensive grazing has occurred within them. The Cott Tank exclosure was completed in 1992 and was lightly grazed in 1995 and 1996. The Gate Spring exclosure was completed in 1994 and heavily grazed in 1994, 1996, and 1997 and was breached but not heavily grazed in 1995. The Falls exclosure was completed in 1995 and breached but not grazed in 1996 and heavily grazed in 1997. The Pig Camp Spring exclosure was completed in 1994 and moderately grazed in 1996. Despite these grazing incursions, substantial development of riparian vegetation and some streambank rebuilding has occurred within the exclosures and the trend is generally upward, with setbacks when grazing occurs with the exclosures (Stefferud and Stefferud unpub. data). In addition to removal or change in livestock use, riparian development, both inside and outside the exclosures, has been influenced by the lack of significant flooding since 1990. Outside the exclosures, little riparian vegetation improvement has occurred and no streambank or channel improvement have been noted. Substantial reaches of stream and springs continue to be heavily trampled by livestock.

There have been a large number of water development projects throughout Redrock Canyon. While most of these were constructed for livestock use, some were installed for wildlife purposes. There are 11 earthen stock ponds or tanks within the drainage, several of which serve as source populations for disseminating nonnative fish. There were at least four wells along the banks of the mainstem (on Redrock Ranch; Redrock Well T 22 S, R 17 E, NW¼ Sec. 7; Redbank Well T 22S, R 17 E, NW¼ Sec. 17; and Silver Tank Well T 22 S, R 17 E, NE¼ Sec. 16) which pump alluvial water. Of those, Silver Tank Well, is now defunct. Redrock Well may still be functional, and the permittee noted in his comments that it "worked one time" (Peterson 1999). A well on the bank of Oak Grove Canyon (T 22 S, R 16 E, NE¼ Sec. 2) which formerly pumped alluvial water was replaced in 1998 with a 400 foot deep well (Collins 1999). Three other wells on unnamed tributaries and upper Lampshire Canyon may use shallow alluvial water. Others in the uplands are deep wells. There are also assorted troughs, pipelines, trick tanks, and guzzlers and a number of defunct and decaying troughs, sills, and pipelines. The effect of these developments individually and cumulatively on the hydrograph of Redrock Canyon are unknown and cumulatively may adversely affect the size and duration of perennial flows.

There has been sporadic mining throughout the canyon, with a large concentration in the area of Candelerio Peak. Numerous mining claims and inactive mines are located throughout the watershed. These activities have probably had serious adverse effects due to increased erosion and sediment, introduction of contaminants into the stream, water use, and roads. Presently there does not seem to be any significant mining activity in the watershed.

There are high clearance roads in much of the drainage. Before, driving the entire length of Redrock Canyon was possible in some years, with much of the road in the stream channel. In some areas there are serious problems with streambank and stream channel destruction and erosion because of the roads. Areas of the roads have substantial erosion problems contributing sediment into the stream. Terrace loss has been accelerated by the roads which ascend and descend floodplain terraces in many places, leaving erosion paths. In 1990, the Forest Service closed the road down Cott Tank drainage and from Redrock Well to Gate Spring. The Cott Tank drainage closure has been highly effective, and the road is rapidly disappearing under revegetation. The Redrock Well to Gate Spring closure has never been signed as closed and until recently received continued moderate use. The new property owners at the Redrock Ranch inholding have now closed the road where it crosses their property which stops access from there to Gate Spring and up into lower Lampshire Canyon. A road from the south into the canyon at Red Bank Well also exists, although the Forest Service is unsure if it is still passable. In October 1988, recent vehicle tracks were present on that road near Red Bank Well, but did not come from up or down the canyon showing the vehicle had come in from the south road. Several other roads continue to receive light to moderate use. In particular, the roads in lower Redrock Canyon appear to have increasing use, and Forest Road 4609 up lower Oak Grove Spring Canyon and its unnamed tributary appears to receive substantial use. Recently a track was cut up the unnamed tributary (T 22 S, R 16 E, E ½ Sec. 26, 35) to access Corral Canyon for the purposes of water development for livestock. The January 28, 1998 Biological Assessment and Evaluation for this road opening based its finding of no effect to Gila topminnow on assurance that this track would not be open for any use other than servicing the water development. Locked gates were installed at both ends. However, the Forest Service has now received requests from the Arizona Game and Fish Department and the Border Patrol to open the track to hunters and Border Patrol agents. Expanding use of this track will increase the use of lower Redrock Canyon, both for uses within Redrock and for access to the extensive area north of Redrock Canyon.

Recreation in Redrock Canyon is increasing. Most current use is dispersed camping, hiking, hunting and general outdoor recreation. Fall hunting is probably the highest use time and is generally associated with 4-wheel and off-road vehicle use along many of the roads and tracks. However, use of the roads as well as the stream channel and off-road tracks by vehicles occurs year-round. In 1995, a vehicle had driven upstream to Gate Spring and through the length of the exclosure. The Arizona Trail enters the Canyon near Down Under Tank in the upper end of Redrock Canyon proper and then runs along the Redrock Canyon bottom to just above the Falls where it exits the canyon over the south ridge into Harshaw Canyon. This trail is open to use by hikers, mountain bikers, and horses. Use at present appears to be light to moderate, although information provided by the Kunde allotment permittee in comments on the draft biological opinion indicate "bicycle rallies, hiking trips, professional horse back trail rides, and hunters use the trail regularly" (Peterson 1999). Trail counters to monitor use were a part of the original project proposal. This information was to be provided to the Service under the terms of the incidental take statement of the December 1992 biological opinion on trail construction and routing. The information has not yet been furnished.

There is one private inholding of 64 ha (160 ac) near the falls in Redrock Canyon. This property was recently sold and the new owners expect to run a livestock on the Kunde permit. On the property is a small, primitive house, several outbuildings, and corrals and fences. An old well and a recently drilled well are also present on the property, and are presumed to draw alluvial water. The property includes almost a mile of Redrock Canyon channel. The stream terrace near the house has been used in the past for sub-irrigated and irrigated pasture. The plans of the new owners for residential use are unknown. The road accessing the property is the main canyon road. The landowners have irregularly maintained the road from the Forest boundary to Redrock Ranch, bringing in heavy equipment occasionally, particularly after floods, to remove gravel buildups and fill washouts. Although this maintenance work has been relatively low-key, it has contributed to channel destabilization and sediment production.

Because of the 1990 Redrock Canyon Action Plan, many rock gabion, reseeding, and other watershed stabilization and restoration projects were installed throughout the drainage. Some of these projects have had only limited success in controlling erosion, although Forest Service comments on the draft biological opinion show that “a large percentage” have been successful.

Among the earliest fish collections from Sonoita Creek were those by Chamberlain in 1904. At Patagonia, he found longfin dace (*Agosia chrysogaster*), desert sucker (*Pantosteus clarki*), Gila topminnow, and Sonora sucker (*Catostomus clarki*). He also noted local reports of small fish, which he surmises may be longfin dace and Gila topminnow, in a tributary 2 or 3 km (3 or 4 mi) southeastward, which may have been Harshaw or Redrock Canyons. Locals also reported that “some years ago” there was good fishing in Sonoita Creek for chubs and suckers. The chub would have been Gila chub (*Gila intermedia*). In 1927, desert pupfish (*Cyprinodon macularius*) were also taken in Sonoita Creek and in 1928 speckled dace (*Rhinichthys osculus*) were found there (Miller 1961). Of these, desert pupfish, Gila chub, and Sonora sucker are now extirpated and Gila topminnow and speckled dace are rare and only desert sucker and longfin dace remain common (Minckley 1969b, Gori 1995). There are no early records of the fish fauna in Redrock Canyon. The first recorded fish surveys there were in the early 1970’s. Only three native species have been recorded since; Gila topminnow, longfin dace, and desert sucker (Simons 1987, Stefferud and Stefferud 1994, Weedman and Young 1997). Desert sucker was recorded once and now appears to have been extirpated from the Redrock drainage (Stefferud and Stefferud 1994).

In addition to physical alterations of the Sonoita and Redrock watershed and stream channels, there have been a number of nonnative aquatic species introduced. Nonnatives adversely affect the native fish community through competition and predation (Courtenay and Stauffer 1984, Meffe 1985, Marsh and Brooks 1989, Propst et al. 1992, Blinn et al. 1993, Douglas et al. 1994) and Gila topminnow are particularly vulnerable to adverse effects from nonnative species (Miller 1961, Meffe et al. 1983, Meffe 1985). Nonnative aquatic animal species recorded in Redrock Canyon include western mosquitofish, largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), and bluegill (*Lepomis macrochirus*) (Rinne et al. 1980, Brooks 1986, Stefferud and Stefferud 1994). Several other nonnatives have been found in Sonoita Creek including red shiner (*Cyprinella lutrensis*) and yellow bullhead (*Ameiurus natalis*) (Gori 1995). There are also a number of nonnative riparian and aquatic plants now present in Sonoita Creek and Redrock Canyon which are believed to have detrimental effects on the stream channels and fish habitat (Stromberg and Chew 1997). These include salt cedar, water cress, bermuda grass, rabbit's foot grass (*Polypogon monspeliensis*), and fountain grass (*Pennisetum* spp.).

There have been five formal consultations on effects of various activities on Gila topminnow in Redrock Canyon and three informal consultation concurrences with findings of "beneficial effect" or "is not likely to adversely affect" (Table 22). All were on Forest Service actions and all formal consultations resulted in findings of no jeopardy to Gila topminnow. For Sonoita Creek there has been four previous formal consultations and no informal concurrences on various activities affecting Gila topminnow. Three of these were for Fish and Wildlife Service recovery activities and one was for the Federal Highway Administration. All were nonjeopardy determinations. For Cienega Creek, there have been four previous formal consultations and three informal concurrences. All were with the Bureau of Land Management for activities affecting Gila topminnow and other listed species and all formals resulted in nonjeopardy findings.

The Forest Service, in Sierra Vista Ranger District comments on the draft biological opinion, expressed concern that the Redrock Action Plan consultation had already covered livestock grazing and that the only purpose of the present consultation was to obtain an incidental take statement for non-range project portions of the grazing program. Although the biological opinion on the Redrock Action Plan did not specify a time-period to which the opinion applied, each biological opinion contains a "reinitiation notice" (entitled "Closing Statement" in this opinion) which discusses the four criteria from the section 7 regulations (50 CFR 402.16) under which reinitiation of consultation on an action is required. The livestock grazing, road, and water development portions of the Redrock Action Plan meet two of those criteria. There is substantial new information on the Gila topminnow, its habitat, effects of the livestock grazing, success or lack of success of various management efforts, road use, and other parameters that would reveal effects to Gila topminnow not previously considered and thereby trigger criteria 2 (see Closing Statement). There are also substantial modifications to the project proposed in the Redrock Action Plan, both already implemented and planned, that would individually and cumulatively change the effects to Gila topminnow and trigger criteria 3. In addition to the new information and effects considered in this biological opinion, those concerned with range projects will require additional consultation beyond this one.

Table 22. Section 7 Consultations in Redrock Canyon, Sonoita Creek, and Cienega Creek.

Project	Date of Opinion or Concurrence	Species	Finding
FORMAL CONSULTATIONS			
Coronado National Forest Plan	Dec. 6, 1985	Gila topminnow, 5 other species	nonjeopardy
Gila topminnow habitat improvement in Redrock Canyon	1982	Gila topminnow	nonjeopardy

Table 22. Section 7 Consultations in Redrock Canyon, Sonoita Creek, and Cienega Creek.

Project	Date of Opinion or Concurrence	Species	Finding
Redrock Canyon Action Plan	November 29, 1990	Gila topminnow Sanborn's (lesser) long-nosed bat	nonjeopardy nonjeopardy
Cienega Creek diversion dam repair emergency consultation	January 2, 1991	Gila topminnow	nonjeopardy
Arizona Trail from Canelo Pass to Patagonia	December 23, 1992	Gila topminnow	nonjeopardy
Cottonwood spring riparian fencing, Partners for Wildlife Project	April 15, 1993	Gila topminnow	nonjeopardy
Cienega Creek headcut repair	January 7, 1994	Gila topminnow	nonjeopardy
Patagonia-Sonoita Creek bridge abutment removal, Partners for Wildlife project	February 23, 1994	Gila topminnow	nonjeopardy
Sonoita Creek, highway 82 repair	June 21, 1994	Gila topminnow	nonjeopardy
Cottonwood Spring fencing extension and headcut control - Partners for Wildlife project	September 12, 1995	Gila topminnow	nonjeopardy
Cienega Creek interim grazing plan	January 8, 1996	Gila topminnow, Lesser long-nosed bat, SW willow flycatcher	nonjeopardy
11 Forest Plans	Dec. 19, 1997	Gila topminnow	nonjeopardy
Cienega Creek Stream Restoration Project	June 3, 1998	Gila topminnow, SW willow flycatcher	nonjeopardy
Informal Consultations - Is Not Likely to Adversely Affect Concurrences			
Stream habitat improvement in Redrock Canyon	Dec. 10, 1981	Gila topminnow	beneficial effect concurrence
Cienega Creek pasture fencing	May 1, 1990	Gila topminnow Sanborn's (lesser) long-nosed bat	beneficial concurrence
Cienega Creek Earth Day project	March 14, 1991	Gila topminnow	beneficial concurrence
Cienega Creek stream gauge	May 10, 1995	Gila topminnow	concurrence
San Rafael allotment grazing permit 1995	Oct. 11, 1995	Gila topminnow Desert pupfish Sonora tiger salamander	concurrence concurrence concurrence

The Redrock Canyon Action Plan, Arizona Trail, and 11 Forest Plan biological opinions gave the Forest Service reasonable and prudent measures and terms and conditions of incidental take statements for Gila topminnow. The San Rafael allotment grazing permit concurrence was conditional on certain changes to the plan. Implementation of these measures and conditions has been spotty, as shown in Table 23.

As the consultation history in Table 22 shows, there are accumulating levels of both adverse and beneficial actions for Gila topminnow in Redrock Canyon, Sonoita Creek, and Cienega Creek. Although data are provided only for Redrock Canyon, Table 23 illustrates that implementation of measures designed to minimize and mitigate the adverse effects is less than complete. It appears there is an accumulating burden of adverse effects that must be considered as the baseline for the present consultation.

The 1986 Coronado National Forest Plan sets up standards and guidelines which apply to management of Gila topminnow and its habitat and to management of livestock grazing. The following are the primary Forest-wide standards and guidelines which are applicable to this consultation:

○ *Maintain or improve occupied habitat of . . . listed . . . species through mitigation of Forest activities . .*

○ *Reintroduce extirpated native species into historical habitats in accordance with cooperative interagency plans.*

○ *Leave drainage strips of existing vegetation in drainages and around waters.*

○ *Fence riparian areas where prescribed by approved allotment management plans.*

○ *Best management practices will be used to minimize the time of recovery to a satisfactory erosion level, minimize soil productivity loss, improve water quality, and minimize channel damage.*

○ *Manage riparian areas to protect the productivity and diversity of riparian-dependent resources by requiring actions within or affecting riparian areas to protect, and where applicable, improve dependent resources.*

○ *Give preferential consideration to resources dependent on riparian areas over other resources. Other resource uses and activities may occur to the extent that they support or do not adversely affect riparian-dependent resources.*

○ *Improve all riparian areas to satisfactory or better conditions by the end of Period 5. (by 2036)*

○ *Twenty-five percent of all riparian areas must be in satisfactory condition by Period 2. (by 1996)*

○ *Maintain at least 80 percent of natural shade over water surfaces in fish bearing streams.*

Table 23. Implementation of earlier section 7 consultation requirements for Gila topminnow in Redrock Canyon.

Consultation/ Concurrence	Level of Anticipated Incidental Take	Implementation	Terms & Conditions (relating to Gila topminnow)	Implementation

Redrock Canyon Action Plan biological opinion	exceeded if more than 20 dead topminnow and/or 20 dead longfin dace occur downstream of activity	not exceeded	- minimize work in surface waters - Pig Camp Spring work planned and supervised by biologist - analysis of operation of Redrock, Redbank and Silver Tank wells - notify Service prior to initiating activities - recording and reporting	- implemented - implemented - not implemented - implemented - partially implemented
Arizona Trail biological opinion	exceeded if - recreational attributable fire occurs in exclosures - corraling of horses occurs in exclosures - persistent evidence of grazing in exclosures - persistent violation of no-camping restrictions - annual interagency review finds cumulative modification	exceeded - has not occurred - has not occurred - has occurred - has not occurred - review has not been done	- minimize disturbance of stream channel - ensure no pollutants go into stream - enforce no-camping restrictions -inspect and maintain exclosures 2 times per year - annual interagency review - written record of project to FWS - written record of trail use to FWS - monitoring of effects to Gila topminnow and habitat - monitoring reports to FWS	- implemented - implemented - implemented - partially implemented - not implemented - implemented - not implemented - implemented - implemented
11 Forest Plans biological opinion	maintenance of current level of habitat quality	implemented	for all Gila topminnow habitat on USFS lands - minimize impacts to Gila topminnow - all reasonable efforts to exclude livestock from occupied habitat - develop and implement standardized monitoring protocol for habitat - annual monitoring reports to FWS	- unknown - not implemented - unknown - not implemented
San Rafael allotment 1995 permit concurrence with "is not likely to adversely affect"	none - conditions of concurrence require monitoring for take when grazing in areas of Redrock Canyon with water	unknown	condition of concurrence was reduction of utilization levels from 45% to 20%	- action was significantly changed - no additional consultation conducted

○ *Maintain at least 80 percent of natural bank protection.*

○ *Maintain the composition of sand, silt, and clay within 10 percent of natural levels in fish bearing streams.*

○ *Maintain at least 60 percent of the woody plant composition in three or more riparian species.*

○ *Maintain at least three age classes of riparian woody plants, with at least 10 percent of the woody plant cover in sprouts, seedlings, and saplings of riparian species.*
○ *On a site-specific basis, identify riparian-dependent resources and develop action plans and programs to bring about conditions essential to supporting those dependent resources.*

○ *Identify key ungulate forage monitoring areas. These key areas will normally be 1/4 to 1 mile from water, located on productive soils on level to intermediate slopes, and be readily accessible for grazing. .... Within key forage monitoring areas, select appropriate key species to monitor average allowable use.*

○ *In consultation with the Fish and Wildlife Service, develop site-specific forage use levels. In the event that site-specific information is not available, average key species forage utilization in key forage monitoring areas by domestic livestock and wildlife should not exceed levels in the above table during the forage growing season.* Table values for the Seibold, Kunde, and Papago/Z Triangle are 20 percent, for the Crittenden are 10-35 percent and for the San Rafael are 15-20 percent.

○ *Forage use by grazing ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species.*

Redrock Canyon and its watershed contains three management area designations in the Forest Plan. Standards and guidelines for management area 1, which includes steeper slopes along the higher elevations of Redrock and Corral Canyons, call for no livestock grazing. Although these areas are not fenced off from other areas of the allotments under consideration here, they are thought to receive little or no grazing use because of the steepness of the terrain. The management emphasis is for visual resources and semi-primitive dispersed recreation.

For management area 4, which includes most of the uplands of Redrock Canyon and almost the entire Crittenden and Papago/Z Triangle allotments, standards and guidelines call for livestock grazing at several levels of intensity and grazing management. Chaparral in management area 4 is to be managed at level B, which calls for 25 percent utilization levels, at 60 percent of full capacity. There are 108 ha (271 ac) of chaparral in the Crittenden and Papago/Z Triangle allotments, probably all outside Redrock Canyon. Grasslands in management area 4 are to be managed at level C, which calls for 30 to 35 percent utilization levels, at 90 percent of full capacity. There are 1,434 ha (3,589 ac) of desert grassland and 4,998 ha (12,494 ac) of plains grassland in the five allotments, although the bulk of the plains grassland lies in the non-Redrock portion of the San Rafael allotment. Woodlands in management area 4 are to be managed at grazing level D at 35 to 55 percent utilization levels, at 100 percent of full capacity with intensive management. This comprises the bulk of the Redrock Canyon allotments, with 14,762 ha (36,906 ac). Objectives for management area 4 include maintaining and improving habitat for listed species, including Gila topminnow and for achieving reoccupation of historical habitat. It is a high priority in this area to restore watershed to a satisfactory condition. Management emphasis is on sustained livestock forage and fuelwood while maintaining and improving game animal habitat.

The bottom of Redrock Canyon, including the Cott Tank drainage bottom and the bottomland along upper Cienega Creek, is in management area 7. Livestock grazing in this area is to be managed at level D (see above) or if objectives cannot be achieved using level D, then the area should revert to management at level A, which calls for no grazing. Management emphasis is to maintain unique wildlife and vegetation and produce livestock forage and fuelwood. Standards and guidelines are to maintain and improve habitat for listed species including Gila topminnow and for achieving reoccupation of historical habitat. Watershed treatment is a high priority.

Although many of the Forest-wide standards and guidelines are being met on the five allotments under consideration here, there are a number that are not or are being only partially met. For example, they call for maintenance of at least 80 percent of natural bank protection. Although substantial progress toward this standard has been made through the construction of four exclosures in Redrock Canyon, the natural bank protection of the majority of streambanks in the canyon is moderately to highly degraded.

The original Coronado Forest plan range standards for the management units involved would generally be met by the proposed action, although the proposed usage is uniformly allowed at the upper end. The Region-wide guidelines for range utilization from the 1996 Forest Plan amendment are not being met. This is presumably because the guidelines allow for substitution of other utilization levels using “site specific information.” That site specific information and the rationale for the higher utilization levels were not furnished to the Service, but given that the five allotments being considered here are in moderately low range condition and on a static or downward trend with unsatisfactory soil conditions, the Service is concerned that the utilization standards based on site specific information are about double that of the amended plan guidelines.

Status of the Species in the Action Area

Seven of the twelve extant natural populations of Gila topminnow may be within the proposed action area. For one of these, the upper Santa Cruz River, the effects from the proposed action on the San Rafael allotment are being dealt within the appendix of this biological opinion. A second and part of a third, the middle Santa Cruz River and lower Sonoita Creek, are sufficiently isolated from watershed effects of the proposed action by the presence of Patagonia Lake, which virtually eliminates any hydrologic, geomorphologic, and sediment effects of the action on those downstream populations. Two others, Cottonwood Spring and Monkey Spring are only marginally able to experience downstream effects from the proposed grazing. Only a very tiny amount of the upper Sonoita Creek drainage above Cottonwood Spring is within the Crittenden pasture of the Crittenden allotment and no downstream effects are expected. Although Monkey Wash also drains off the Crittenden pasture, the spring itself is outside the allotment and is not within the floodplain of the wash and is therefore not subject to watershed effects from that drainage. The other three populations, Sonoita Creek above Patagonia Lake, Cienega Creek, and Redrock Canyon are expected to experience adverse effects because of the proposed action.

Cienega Creek supports the largest existing Gila topminnow population, is one of only three populations uncontaminated by nonnative fish, and is one of only two natural populations on public lands (the other being Redrock Canyon). There are approximately 10.5 km (6.5 mi) of perennial habitat in Cienega Creek itself, 1.7 km (1.1 mi) in Mattie Canyon, and 1.5 km (0.9 mi) in Empire Gulch, both tributaries to Cienega Creek (Simms and Simms 1991). Areas of warmer groundwater discharge have been found to hold extremely high densities of Gila topminnow at certain times (566/square meter) (Simms and Simms 1991).

Open water fish habitat along Cienega Creek, Mattie Canyon, and Empire Gulch is quite complex and include shallow off-channel ponds; deep, narrow, vertical walled pools; shallow, bowl-shaped pools; low gradient riffles; narrow, swift runs; water falls; cascades; sheet flow over bedrock slabs; and dense marsh. Stream gradients are low, usually less than one percent. Fine textured alluvium (silt, sand, and clay) and marsh adapted plants fill shallow channels with low banks and wide flood plains. The broad floodplains are covered with extensive stands of sacaton grass and bordered by Goodding willow, cottonwood, ash, and other riparian trees.

A fall fish inventory was done annually from 1989 to 1994 in Cienega Creek (Young and Lopez 1995). Besides Gila topminnow, the only fish in the creek are the native longfin dace and Gila chub. Gila topminnow are common to abundant throughout all years from the beginning of perennial flow above the confluence with Gardner Canyon downstream to the Narrows.

The Cienega Creek watershed was closed to fishing by the Arizona Game and Fish Commission in 1996. This action was taken to help protect Cienega Creek from invasion by nonnative fish, which are often imported during fishing activities. The Bureau of Land Management has also taken many actions to improve conditions along Cienega Creek for Gila topminnow and other native aquatic and riparian species. Exclosure fencing now restricts livestock grazing along large portions of the creek and revegetation of some riparian areas is underway.

Along with Cienega Creek, Redrock Canyon supports the only two relict natural populations of Gila topminnow existing on public lands. Gila topminnow in Redrock Canyon were discovered in the late 1960’s (Rinne et al. 1980). Gila topminnow occupies the perennial stretches in Redrock Canyon and experiences rapid population expansion into available intermittent waters during wet periods (Simons 1987, Bagley et al. 1991, Stefferud and Stefferud 1994, U.S. Forest Service unpub. data). The three main population centers are in the Cott Tank drainage, at Gate Spring, and at the falls. The length of stream occupied by each of these populations varies from year to year. Not only does the area of stream occupied vary, but the populations themselves fluctuate substantially over time. This bellows-like expansion and contraction of populations is a basic part of the life history of the species the bulk of whose original habitat was backwaters, sloughs, and other fluctuating environments along major rivers and streams (Deacon and Minckley 1991). The small streams and springs in which we find Gila topminnow today represent only a minor, and marginal part of what was originally the habitat of the species.

At Gate Spring, the watered reach and Gila topminnow populations vary substantially. In the wetter years of the late 1980’s and early 1990’s the water often extended from the Gate Spring location shown on the USGS 7.5 minute topographic maps about 0.75 km (0.5 mi) downstream. But, in June 1996 there was only one small pool at Gate Spring (Stefferud 1996). A little over half the 0.75 km of flow that is sometimes present is within the exclosure. When water is present, it is primarily shallow runs and riffles with a few pools. In 1982, three small concrete deflectors were constructed in an attempt to introduce localized sinuosity and velocity into the channel, thereby causing pool formation. Only the lowermost of these structures have succeeded in creating a pool. The Gate Spring Gila topminnow population ranges from none to abundant. In 1988, Gila topminnow were found throughout the 0.75 km of water present. No Gila topminnow have been found at Gate Spring since November of 1995, probably due to the dry 1996 conditions. No substantial flooding has occurred since then to allow fish to move through the long dry stretches of channel from Cott Tank drainage or elsewhere to repopulate Gate Spring. Longfin dace, are also often abundant at Gate Spring and throughout all water present, but have not been found there since 1995. Mosquitofish are rare at Gate Spring, having only been found there in 3 of 17 samplings since 1979, all of which were before 1995. A late December 1998 report by a Forest Service range conservationist of "fish" at Gate Spring (Edwards 1999) has not been confirmed and no fish were present during sampling in late October 1998. Fish reports by non-fish specialists are often mistaken, such as the late May report of "weird fish" in pools near Silver Tank Well, where Service and Forest Service fish biologists found no fish a week later (J. Stefferud 1999; S. Stefferud 1999).

At the falls area surface flow varies from a few small pooled areas in June 1989 (Stefferud 1989) to about 1.5 km (about 1 mile) in May 1988 (Stefferud 1988). Gila topminnow are generally rare to abundant below the falls and have not been taken in the stretch just above the falls since 1993. Only in October 1991 have no topminnow been found in this area in the 20 samples since 1979. Longfin dace are common to abundant at this site except in 1996 and 1997 when they were rare. Another native fish, the desert sucker, was found just below the falls in 1987, but not since. The only nonnative fish species here is mosquitofish which are rare, having been found there only in 1992. Both topminnow and longfin dace expand their populations during years of increased surface flow and in 1988 occupied the entire 1.5 km. However, during dry years, populations of both species may crash, and may appear to disappear entirely, as Gila topminnow did in 1991. Although it may appear logical that movement of Gila topminnow downstream has replenished or maintained this population from the larger Cott Tank drainage population, recent genetic information suggests this is not entirely true (Hedrick and Parker 1999). This recent work shows the Gila topminnow at the falls site (sample from downstream of the falls) have a significantly higher genetic diversity than those at the Cott Tank drainage (no data are available on topminnow at Gate Spring). Thus, although genetic interchange between the two subpopulations undoubtedly occurs, it apparently occurs only in the downstream direction and supplies only part of the genetic diversity found at the falls. Given the barrier presented by the falls, it is expected that there is no upstream movement of genes to Cott Tank drainage, however, the origin and maintenance of the higher genetic diversity below the falls does not lend itself to easy explanation. The numbers of the population downstream of the falls may never fall as low as we previously believed, there may be a permanent population downstream which provides upstream immigrants, or there may be undiscovered populations in tributaries that are contributing immigrants.

In addition to these three main centers of Gila topminnow in Redrock Canyon there are several other areas where the species occurs. Gila topminnow, along with longfin dace, are sporadically found in Pig Camp Spring, a small spring just off the Redrock Canyon channel in T 22 S, R 16 E., SW¼ of the NW¼ Sec. 2. They are also occasionally found just downstream from that point in small pools in the Redrock Canyon channel. In 1998, Gila topminnow were also found in the

Redrock channel in T 22 S, R 16 E, NE¼ of the NW¼ Sec. 3 about 1.2 km (0.75 mi) upstream from the Forest boundary. Longfin dace were also present and in 1990 mosquitofish were also found here. Even in the relatively dry year of 1989 surface water was present and longfin dace were found, but the site was dry in June 1996.

In April 1987, the Arizona Game and Fish Department found Gila topminnow and longfin dace at two places in the Oak Grove Spring drainage (Simons 1987). Although the main Oak Grove Spring Canyon and two of its tributaries have been resurveyed in July 1987, October 1990, and October 1998, no other Gila topminnow have been found. However, mosquitofish were found in a small isolated pool about halfway up Oak Grove Spring Canyon in October 1990. These infrequent surveys and scanty data indicate that the three species of fish all use portions of Oak Grove Spring drainage during periods when surface water is available, but that these periods may be relatively rare given the conditions during the 1987-98 period.

In 1987 mosquitofish were found in Lampshire Canyon near the dam in the south half of T 22 S, R 17 E, Sec. 6 (Simons 1987). Then in May 1987, Gila topminnow and longfin dace were found in the same area, and again in 1992 longfin dace were found there (Simons 1987, Stefferud 1992). No fish surveys have been done in Lampshire Canyon since 1992. It appears that Lampshire Canyon is colonized by all three species during periods of available surface water but that upstream movement is prevented by the dam.

Successful conservation of fish populations requires thinking with a landscape perspective (Grossman et al. 1995). Earlier planning and conservation efforts for Gila topminnow in Redrock Canyon have accented site-specific protections for individual populations in a "refugia" approach without regard to the spatial components of its ecology in Redrock Canyon. This neglect of the landscape scale may result in short-term gains for Gila topminnow while failing to secure long-term viability. Gila topminnow in Redrock Canyon form a metapopulation, with at least seven subpopulations between which individuals sporadically migrate. A metapopulation can be defined as a set of local populations in which individuals rarely move from one place (population) to another, typically across unsuitable habitats and with substantial risk of failing to find another suitable habitat (Hanski and Gilpin 1991). The seven known subpopulations include: 1) Cott Tank drainage/Redrock at Silver Tank, 2) Gate Spring, 3) falls, 4) Pig Camp Spring and adjacent Redrock channel, 5) about 0.75 km (0.5 mi) above Forest boundary, 6) Oak Grove Spring Canyon, and 7) Lampshire Canyon. Topminnow has perennially occupied some while the species may only use others every few years or at longer intervals as water is available. This type of metapopulation where many or all of the subpopulations are ephemeral or have high extinction probabilities is common among many kinds of animals and requires a pattern of frequent recolonization (Ehrlich 1983). In such a metapopulation the availability for colonization of currently unoccupied habitat, such as Oak Grove Spring and Lampshire Canyons, may be critical to the long-term survival of the metapopulation as a whole (Meffe and Carrol 1994). As with any metapopulation, it is not just the suitable or potentially suitable habitats that are important. The migration corridors between those habitats and their condition are equally important to the maintenance of the populations and migration is particularly important for small populations confined to headwater streams, such as Redrock Canyon (Meffe and Carrol 1994, Fausch and Young 1995). The traditional view of restricted movement in "resident" fishes, such as Gila topminnow, has been shown often to be incorrect (Fausch and Young 1995) and the available information on Gila topminnow, as well as longfin dace and mosquitofish, in Redrock Canyon shows that there may be substantial movement throughout all of the lower-gradient portions of the canyon when water connections occur. Existing conditions in some subpopulation habitats in the Redrock drainage may not presently be suitable for sustaining Gila topminnow, and to restore their function to the metapopulation will require both removal of adverse impacts that restrict habitat quantity and quality and removal of barriers to migration.

Less is known of the Sonoita Creek population of Gila topminnow than for Redrock Canyon. The only ongoing fish monitoring above Patagonia Lake is on The Nature Conservancy Patagonia Preserve. Gila topminnow have not been found at the Preserve since 1990 (Simons 1987, Bagley et al. 1991, Brown and Abarca 1992, Gori 1995 and 1997, Weedman and Young 1997). The only recent records of Gila topminnow from the area are observations in 1994 by Service personnel at the highway rest area 5.6 km (3.5 mi) downstream from the town of Patagonia (Stefferud 1994) and four specimens taken from just above Patagonia Lake in T 22 S, R 15 E, Sec. 28 and deposited at the Arizona State University Collection of Fishes (Spiller 1995). This population is considered tenuous and prone to extinction from small or cumulative adverse actions to its habitat.

Effects of the Action

<u>Direct and Indirect Effects</u>

Effects to Gila topminnow from the proposed action differ in Cienega Creek, Sonoita Creek, and Redrock Canyon, but are cumulative to each other when the effects are viewed for the species as a whole. The seriously imperiled status of Gila topminnow, together with the degraded environmental baseline for Sonoita Creek and Redrock Canyon, make even small adverse effects to the species and these habitats of serious concern. As the draft revision of the Gila topminnow recovery plan points out, the status of this species is such, and the habitat loss so severe, that recovery is only a long-term vision, and the short-term goal is simply to prevent the extinction of the species within the Gila basin (Weedman 1998).

General effects of livestock grazing on watershed functions and stream channels were discussed earlier in this opinion. That discussion is applicable to the five allotments being considered here. Analysis of the effects of livestock grazing on fish and fish habitat requires looking at subtle, long-term gradual changes in watershed functions, riparian and aquatic communities, and stream channel morphology. The long-term cumulative aspect of grazing impacts, combined with the short-term limited data available on range condition and fish and fish habitat make a purely empirical analysis of the effects of grazing and grazing management difficult and often misleading. However, extrapolations of hydrologic and biologic principles and site-specific research data provide a large body of evidence linking degradation of watersheds, stream channels, aquatic and riparian communities, and fish habitat and populations in western North America to grazing and grazing management (Leopold 1924, Leopold 1951, York and Dick-Peddie 1969, Hastings and

Turner 1980, Dobyns 1981, Kauffman and Krueger 1984, Skovlin 1984, Kinch 1989, Chaney et al. 1990, Platts 1990, Armour et al. 1991, Bahre 1991, Meehan 1991, Fleischner 1994, Ohmart 1996, Sidle and Sharma 1996, Cain et al. 1997, Fitch and Adams 1998, Belsky et al. 1999).

For Cienega Creek, the effects from the proposed action result from livestock grazing on the Cave, Papago, and West Mountain pastures of the Papago allotment. Much less than half of the Papago allotment lies within the Cienega Creek drainage and, although the upper end of Cienega Creek [about 4 km (2.5 mi)] and several of its small feeder streams are in the allotment, that portion of the creek is intermittent except near Papago Spring. The moderately low range condition of the allotment combined with the 99 percent downward trend and the 82 percent unsatisfactory soil conditions show that the portion of the allotment in the Cienega Creek watershed is contributing excess sediment and declining channel conditions downstream. However, the small portion of the watershed involved; the 16-kilometer (10 mi) distance between the allotment and the Gila topminnow population; the short-term nature of the proposed action; the above average condition of much of the riparian vegetation on Cienega Creek; and the excellent condition of the Gila topminnow population; combine to lessen the adverse impact created by the poor condition of this portion of the watershed and continuation of an action that prevents or delays recovery of the area. The burgeoning ranchette development on the headwaters of Cienega Creek intensifies the downstream adverse effects from the unstable conditions on the Papago allotment. Erosional problems, such as the headcut on Cienega Creek, may partially result from upper watershed problems, such as on the Papago allotment. In response to comments from the Papago allotment permittee, while headcutting is primarily an erosional process from downstream to upstream, the overall disturbance of stream channel stability due to upstream actions may be the ultimate cause of the more proximate erosion represented by the headcut.

The effects to Gila topminnow in Sonoita Creek are similar in mechanism and type to those for Cienega Creek, but are much higher in level. Sonoita Creek will experience adverse effects from the proposed livestock grazing on all five of the allotments. All five contain portions of the Redrock Canyon watershed which contribute to the hydrologic and sediment regimes of Sonoita Creek. Gila topminnow is rare and might not be doing well in Sonoita Creek above Patagonia Lake. The presence of such a large area of the watershed with relatively high levels of unsatisfactory soil conditions and moderately-low range conditions with part of them in a downward trend, means that Sonoita Creek will experience the altered sediment and runoff patterns that such conditions create. Because of the increased soil compaction and erosion, loss of cryptobiotic crusts, decreases in vegetative cover, and decreased infiltration; poor watershed conditions result in "flashier" and more erosive streams defined by prolonged low flows with decreased volumes and shortened flood events with higher volumes (Gifford and Hawkins 1978, Weltz and Wood 1986, Harper and Marble 1988, Orodho et al. 1990, Schlesinger et al 1990, Elmore 1992, Johnson 1992, Waters 1995, MacAuliffe 1997).

Effects to Gila topminnow in Redrock Canyon from the proposed action are direct and immediate and also long-term and cumulative. Effects would generally occur through five mechanisms: 1) watershed and hydrologic alteration, 2) physical destruction and alteration of streambanks, channels, and the water column, 3) alteration of the riparian vegetation community,

4) alteration of the faunal community, and 5) effects from non-grazing and structural elements (those already existing -- proposed projects are not included in this consultation).

Because there have been earlier consultations on livestock grazing in Redrock Canyon, much of this analysis will focus not on the basic effects of livestock grazing on Gila topminnow and their habitat, which has already been discussed, but on the change achieved or not achieved during the past nine years of implementing the action considered in the 1990 biological opinion. In 1990 the management approaches included substantial changes from the earlier grazing practices intended to improve range, riparian, and aquatic conditions in Redrock Canyon. For Gila topminnow these changes were to result in several improved conditions. The exclusion of four perennial water areas from any grazing was to allow riparian vegetation and channel stabilization and recovery. The prescription for winter grazing only in the remainder of the channel of Redrock Canyon proper was to provide for a more limited recovery of riparian vegetation and channel stability in the non-excluded reaches. No consideration was given to stream channel migratory corridors in other pastures. Construction of additional livestock waters was intended to achieve a more even distribution of cattle and reduce the tendency to congregate in the stream channels. The type of waters developed were intended to limit the amount of open ponded water and confine it to nonnatural substrates, such as troughs, to minimize the creation of habitat for nonnative fish and other aquatic species. In addition, there were other actions in the 1990 plan for roads and watershed restoration that are not part of the action currently being consulted on.

The following discussion is based primarily on personal observations and repeat photopoints during annual Fall Fish Count monitoring by Sally Stefferud of the Service and Jerome Stefferud of the Forest Service and on repeat monitoring and photopoints of channel condition throughout the length of Redrock Canyon and Cott Tank drainage by Jerome Stefferud in 1989 and 1996.

The exclosures were successful. The Cott Tank exclosure achieved substantial gains in riparian vegetation and streambank structure. The bottom of the valley has changed from an open area where the grasses and other herbaceous vegetation were short with bare ground between and walking was easy, to a heavily vegetated area with few open spaces or bare ground and through which walking is difficult. A primary component is deergrass which has become dense and tall. Before the exclosure this area had few riparian trees. There are now willow and cottonwood saplings and seedlings scattered throughout, although some of these are the result of plantings by the Forest Service at the time of exclosure construction. In the stream channel, little has changed with the trench pools. However, the areas between the pools have changed from open shallow riffles, to marshy seepage through vegetation or deep runs. There has been a reduction in surface water during the period in which the exclosure has been in place. This is most likely a result of the reduced precipitation experienced during that period. However, it may also be exacerbated by the increased vegetation. As the vegetative and litter cover builds, surface flow is expected to be first reduced as the bank storage is built up and then increased as surface flows increase and become less variable due to the increased storage. Despite the lower precipitation, the surface flow in Redrock Canyon proper below the Cott Tank exclosure appears to have increased in duration and length, presumably as a result of exclosure effects.

The Gate Spring exclosure has been less successful during the five years it has been in operation. However, despite heavy grazing within the exclosure in 1994, 1996, and 1997, there have been substantial gains in woody riparian vegetation. There has been some response in the stream channel with some marshy area replacing the open gravel channel in the lower portion of the exclosure. The Falls exclosure has only been in place since 1995 and was heavily grazed in 1997. However, there has been substantial increase in density and size of riparian vegetation within the exclosure. These observations must be viewed with the caveat that no significant flooding has occurred since exclosure construction. Short-term setbacks in riparian vegetation and channel morphology would be expected when flooding occurs, followed by long-term increases in riparian vegetation and channel and bank rebuilding.

As discussed earlier in the Environmental Baseline section, the winter grazing in the remainder of the Redrock channel does not seem to have been successful. The deferred rotation grazing practiced in Oak Grove Spring and Lampshire Canyons also does not appear to have resulted in any significant gains in riparian or channel conditions. The meadow areas[1] at Oak Grove Spring were as trampled[2] in October 1998 as they were in October 1990 (Stefferud and Stefferud unpub. data). These moist stringer meadows above a short bedrock canyon known as Oak Grove Spring. Surface water is present, although it may be confined to the bedrock canyon during very dry periods. The Oak Grove Spring complex has the potential to form small cienega-like aquatic habitats like those found in upper Cott Tank drainage, however at present the Oak Grove Spring complex consists of open, trampled areas with little surface water. Once protected from livestock use and trampling, they would be expected to develop significantly more riparian vegetation and increased surface water, including trench pools, similar to those in upper Cott Tank drainage where Gila topminnow are presently found. Increased surface water in areas of subsurface flow can result from removal of livestock impacts (Elmore 1992) and although perennial surface water is very limited now in the Oak Grove Spring complex, it would likely increase substantially as bank storage improved following removal of livestock impact.

The precarious status of Gila topminnow dictates that we must find ways not just to minimize adverse impacts on the few remaining natural populations, but to find ways to drive those populations in an upward direction. As one of only two natural populations on Federal lands, Redrock Canyon is very important in the survival and recovery of the species. The population of Gila topminnow in Redrock Canyon has declined in recent years. This may be an artifact of the

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[1]The "meadow areas" at Oak Grove Spring are the narrow channel-bottom areas within the tributaries with grasses, sedges, deergrass, and cottonwood present and either surface water or vegetation indicating water is present near the surface.

[2]Trampling is defined by Vallentine 1990 as "Treading under foot; the damage to plants or soil resulting from the hoof impact of grazing animals." As used here it includes, but is not limited to, hoof imprints, displacement of plants or soil, soil compaction, trailing, hummocking of moist soils, individual plant breakage or death, denudation of vegetation from areas, and bank breakdown or compaction.

lower precipitation and therefore lower surface flows. It is likely that Gate Spring dried completely in 1996 and eliminated both Gila topminnow and longfin dace there. In addition to the loss of topminnow at Gate Spring, the population at the falls has been relatively low in many of the past years and no topminnow have been found above the falls since 1993. The proportion of mosquitofish to topminnow is increasing in the Cott Tank drainage.

To stabilize and increase the Gila topminnow metapopulation in Redrock Canyon, there are several basic goals. We need to:

1. increase the amount of flowing surface water in both length and duration,

2. increase the stability and complexity of the habitats in areas now or formerly occupied by Gila topminnow,

3. take steps that will allow development of suitable habitat and presently unoccupied sites,

4. improve channel conditions to enhance the ability for Gila topminnow to migrate between subpopulations during periods of flow, and

5. reduce or eliminate nonnative aquatic species that are detrimental to Gila topminnow.

Achievement of all these goals is related to management of livestock grazing within the watershed.

The proposed action will restrict or prevent achievement of those goals. While the four exclosures and other livestock management measures over the past nine years have accomplished movement toward those goals, utilization and trampling of riparian vegetation and stream channels will continue to occur at occupied Gila topminnow sites below Cott Tank drainage, below Gate Spring once reoccupation of that site occurs, just below Pig Camp Spring, and at the site about 1.2 km (0.75 mi) above the Forest boundary. These adverse effects will reduce the capability of the habitat to support larger and healthier Gila topminnow populations with an increased ability to coexist with nonnative species, such as mosquitofish.

The continued grazing of potential habitat, such as Oak Grove Springs and Cottonwood Spring in Lampshire Canyon, will prevent these sites from developing aquatic habitat capable of supporting Gila topminnow. The lack of sufficient improvement of these sites in the past nine years under the existing grazing management has not shown that continuation of that management will achieve any different results.

Given that the range conditions throughout the drainage are only moderately low and that soil conditions are unsatisfactory, the rotational management proposed for the upland pastures is not likely to result in near-term increases in watershed condition that would restore channel conditions in the intermittent and ephemeral channels that form the migratory corridors between the subpopulations of Gila topminnow. Restoration of these areas will take a long time and the existing grazing management has shown little ability to achieve restoration at all, let alone in a short time.

The permittee on the Crittenden and Seibold allotments, in comments on the draft biological opinion, aired concern that the opinion omitted discussion of the causes of failure of recent Gila top minnow natural and reintroduced sites (Collins 1999). The permittee believes that most reintro duced populations fail and that many recent losses of both natural and reintroduced isolated Gila topminnow populations have been due to non-grazing related causes, such as mine spills, drying of stock tanks, flooding, nonnative fish introduction, etc., (Brooks 1985, Weedman and Young 1997). He believes this supports a conclusion that livestock grazing is not a serious adverse impact to Gila topminnow in Redrock Canyon and that presently unoccupied sites, such as Oak Grove Spring, cannot successfully support Gila topminnow. The Service does not agree with these conclusions. Loss of Gila topminnow from its large historic range is believed to have resulted from, among other things, watershed and stream channel alterations caused by livestock grazing (Weedman 1998). The distinction between proximate and ultimate causes of extirpation events is often difficult, particularly when limited information is available. Loss of a Gila topminnow population to flooding may be ultimately the result of watershed alteration by a century of livestock grazing perpetuated by continued livestock use. In addition, causes of failure of reintroduced populations is biased due to use of unnatural habitat, such as stock ponds, wells, etc., which are subject to a whole suite of factors not affecting natural habitats. There is, of course, a possibility that Oak Grove Spring can never recover to the point where it will provide sufficient quality and quantity of habitat to support Gila topminnow. However, given its similarities to the upper Cott Tank drainage and given the known potential for immigration from the mainstem, the Service believes it is likely that amelioration of livestock impacts at Oak Grove Spring will result in habitat that can support an important population of Gila topminnow.

Water development for, and use by, livestock within the Redrock drainage may be adversely affecting surface flows. Information on the extent and cumulative impacts of water development is needed to determine if surface flows can be improved by curtailing or reformulating existing and future water developments. Continuation of the existing management will not allow that problem to be addressed or remediated.

The existing livestock management has made strides forward in curtailing the spread of nonnative fish. All recent water developments have been made with great sensitivity toward not providing habitat or dissemination opportunities for nonnative fish. However, there are many existing earthen tanks within the drainage. Continuation of the existing livestock management program means the continuation of the existence of those tanks, some of which are known to contain and disseminate nonnative fish.

Cumulative Effects

Cumulative effects are those of future non-Federal (State, local government, or private) activities on endangered or threatened species or critical habitat that are reasonably certain to occur during the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative in the proposed action.

In the Cienega Creek watershed between the Papago allotment and the stream portion occupied by Gila topminnow there are many non-Federal activities that contribute cumulative adverse effects. The town of Sonoita and the ranchette development to the east contribute destabilizing effects to the watershed, including increased sediment, pollution, and alteration of the hydrologic cycle. These developments also increase the opportunity for the introduction of nonnative aquatic and riparian species that may adversely affect Cienega Creek and the Gila topminnow. The increasing human population creates greater recreation use along Cienega Creek with many attendant problems. Probably most seriously, the growing use of groundwater in the upper Cienega Creek watershed creates a potential threat to the flow of Cienega Creek. Roads, livestock grazing, and other activities within the upper Cienega Creek watershed also contribute their share of cumulative adverse effects.

Within Redrock Canyon there are few activities that are non-Federal. The only non-Federal land is at Redrock Ranch. Given the new ownership of this inholding, it is not known what activities can be expected on the property. We understand that a new well has been drilled on the property, but we have no data on the aquifer from which this well draws, therefore we cannot assess the potential for adverse impact on surface flows in the Canyon. The potential exists for residential use, livestock grazing, and small-scale farming on the inholding. The flat portion of the property is directly on the bank of the stream channel and any disturbance that further destabilizes or erodes the remnant terrace would be adverse to the functioning of the stream.

The Sonoita Creek Valley supports a growing human population. Refer to the environmental baseline section for further discussion on that issue. The adverse impacts to streams and their geomorphology and hydrology from urban and suburban development are well known (Dunne and Leopold 1978, Horak 1989, Matthews and Gelwick 1990, Medina 1990, Tellman et al. 1997). In addition, substantial alteration of the Sonoita Creek channel has occurred and will continue to occur within and above Patagonia to protect homes and human property within the floodplain from the effects of high water. Highway 82, other roads, agriculture, and recreation, all contribute adverse effects to Sonoita Creek, altering the habitat and contributing to the very rare and apparently declining status of the Gila topminnow in Sonoita Creek above Patagonia Lake. Patagonia Lake is a major source of nonnative fish and other noxious aquatic species into Gila topminnow habitat. Countering some of these adverse cumulative impacts are the increasing stability and riparian and aquatic conditions on The Nature Conservancy's Patagonia Preserve. The Preserve will also help to improve the adverse effects of the livestock grazing in Redrock, Corral, Dark, Monkey, and Alamo Canyons by providing a filter for sediment and a complex channel with abundant vegetation to slow and dissipate the flashiness of the flows from upstream.

The American Fisheries Society has adopted a position statement regarding cumulative effects of small modifications to fish habitat (Burns 1991). That statement concludes that accrual of localized or small impacts, often from unrelated human actions, pose a serious threat to fisheries. It also points out that some improvement efforts to fish habitat may not result in cumulative increases in status of the species, but instead may simply mitigate cumulative habitat alterations from other activities. Because of the increasing amount of non-Federal actions in the Sonoita and Cienega watersheds, any improvement efforts applied to the five allotments under consideration here, may only result in offsetting the adverse effects of the cumulative non-Federal actions.

Conclusion

After reviewing the current status of the Gila topminnow, the environmental baseline for the action area, the direct and indirect effects, and the cumulative effects of the proposed action, it is the Service's biological opinion that the proposed ongoing livestock grazing on the Seibold, Kunde, San Rafael, Papago/Z Triangle, and Crittenden allotments is not likely to jeopardize the continued existence of Gila topminnow.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the ESA, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued to any applicant, permittee, or contractor, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant, permittee, or contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest Service must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Incidental take from the proposed livestock grazing on the Seibold, Kunde, San Rafael, Crittenden, and Papago allotments is expected to occur both as direct mortality of individual Gila topminnow and as indirect loss resulting from habitat modification and destruction in Redrock Canyon and Sonoita Creek. No incidental take is anticipated in Cienega Creek as a result of the proposed action. Direct mortality may occur during reconstruction or maintenance of existing cross-channel fences, during trampling of stream channels by livestock, and incidental consumption of small topminnow during livestock watering. Indirect take may occur through habitat alteration and loss due to grazing within unfenced occupied habitat; grazing within the exclosures when fences periodically are washed out, cut or damaged; dissemination of predatory and competitive nonnative aquatic species through livestock waters; maintenance of degraded conditions in intermittent or ephemerally flowing migration areas between subpopulations of Gila topminnow; reduction in surface flows due to water development and watershed degradation; alterations in the hydrograph that result in flashier streamflows; and maintenance of watershed conditions that result in an unstable stream channel in Redrock, Lampshire, or Oak Grove Spring Canyons.

The anticipated level of take cannot be quantified as numbers of individual fish. Gila topminnow are a short-lived, highly fecund species whose natural cycle includes large, rapid fluctuations that make population estimates difficult to obtain and that mask changes due to take from human actions. In addition, dead fish are seldom found due to their small size and rapid consumption by scavengers. Therefore, the level of anticipated take will be quantified differently depending upon the action; i.e. 1) for construction, development, or maintenance actions, and 2) for general ongoing livestock grazing and its management.

1. For construction, development, or maintenance projects (e.g., reconstruction or maintenance of existing fences across the stream channel or existing road and water development or maintenance in connection with grazing activities) the Service anticipates that direct take of Gila topminnow will occur at a level that will result in no more than 20 dead or dying fish of any species being observable near the activity, or within 0.5 km (600 yards) downstream of the activity, during implementation or within three hours following completion. If this level of mortality is observed, then the Service recommends that work should be halted and consultation reinitiated.

2. For the general ongoing livestock grazing and its management, take will be considered to have been exceeded if any one of the following conditions occur:

a) an exclosure fence is down or open for more than two weeks while permitted cattle are in any pasture next to the exclosure or for more than three months in any given year,

b) livestock grazing occurs within an exclosure at a level resulting in more than five percent utilization of woody riparian species (measured as percentage of apical meristems within 2 m (6 ft) of the ground grazed) and trampling, chiseling, or other physical impact by livestock on more than 10 percent of the alterable streambanks by length,

c) the proposed grazing management does not result in a reversal of downward trends on the Sonoita Creek watershed portions (including Redrock Canyon) of the Papago/Z Triangle and San Rafael allotments within five years, unless the failure to achieve static or upward trends are due to causes unrelated to, and not cumulative to, livestock grazing and its management, and changes in the grazing and its management would not reverse or ameliorate the downward trend,

d) the proposed grazing management does not result in altering static trends on the Seibold, Kunde, and Crittenden allotments into upward trends within three years, unless the failure to achieve upward trends is due to causes unrelated to, and not cumulative to, livestock grazing and its management, and changes in the grazing and its management would not alter or ameliorate the static trend,

e) the proposed 45 percent utilization levels are exceeded by more than five percent (i.e., 50 percent utilization) at any time, or

f) range, watershed, or soil conditions decline at any time, unless those declines are due to causes unrelated to, and not cumulative to, livestock grazing or its management, and changes in the grazing or grazing management would not affect or ameliorate those declines.

If, during the course of the action, the amount or extent of the incidental take anticipated is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Forest Service must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

EFFECT OF THE TAKE

In this biological opinion, the Service finds the anticipated level of incidental take is not likely to result in jeopardy to Gila topminnow.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking authorized by this biological opinion.

1. Conduct all proposed actions in a way that will minimize direct mortality of Gila topminnow.

2. Conduct all proposed actions so that will minimize loss and alteration of Gila topminnow habitat.

3. Monitor the fish community and habitat to document levels of incidental take.

4. Maintain a complete and accurate record of actions which may result in take of Gila topminnow and their habitat.

TERMS AND CONDITIONS FOR IMPLEMENTATION

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service is responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. Implementation of terms and conditions is nondiscretionary.

1. The following terms and conditions will implement reasonable and prudent measure 1.

a. Extend the Cott Tank exclosure approximately 0.5 km (0.25 mi) downstream to include the occupied habitat located below the confluence of Cott Tank drainage and Redrock Canyon proper. The exact location of the downstream fence shall be determined on-the-ground in consultation with the Service and Arizona Game and Fish Department. Side fences shall be similarly placed to those of the existing exclosure. Pass-through openings for hikers may be installed in the exclosure extension, but the Arizona Trail shall be rerouted around the exclosure to accommodate horse use. A pipeline from Silver Tank Well to a holding tank and trough/s on the southwest side of the canyon may be constructed as part of this term and condition. If the pipeline is to be buried under the stream channel, approval of the Service for the project design must be obtained. This exclosure shall be in place no later than 1 ½ years (18 months) from the date of this opinion.

b. Close the road from Downunder Tank at the east fenceline of the new Cott Tank exclosure extension. The road closure shall be made in conjunction with the exclosure extension in Term and Condition 1a. If the road is required to be made available to access mining claims, then the potential should be evaluated, and implemented if feasible, for providing access along an old track which bypasses the site of the exclosure on the north. If access via that track is not feasible, then a set of locked gates shall be installed to allow access for miners with legitimate claims. The San Rafael permittee may be also be allowed vehicular access through these gates for maintaining and operating the Red Bank Well. The number, purpose, and timing of vehicular access by the permittee shall be described in the Annual Operating Instructions for the grazing permit. The Forest Service will evaluate other means of accessing Red Bank Well, such as the four-wheel drive road that enters Redrock Canyon from the south at Red Bank Well.

c. Minimize use by livestock in the perennial/semi-perennial stretch of Redrock Canyon found approximately 1.2 km (0.75 mi) upstream from the Forest Service boundary in T 22 S, R 16 E, NE¼ of the NW¼ Sec. 3. This reach is approximately 0.75 to 1.2 km (0.5-0.75 mi) long. Incorporate grazing guidelines to achieve this objective in the Annual Operating Plan of the grazing permit. Methods to be used can include, but are not limited to, temporary drift fences, gap fences, herding cattle along the road rather than through the riparian area, restrictions on season of use, etc. Monitoring of utilization of woody riparian vegetation and physical impacts on streambanks will be done before, during, and after cattle have been in the pasture. A fenced riparian exclosure will be constructed if utilization in the area exceeds 15 percent utilization of woody riparian species (measured as a percentage of apical meristems within 2 m (6 ft) of the ground grazed) or trampling, chiseling, or other physical impact by livestock on more than 10 percent of the alterable streambanks by length in any two of the first three years following the date of this biological opinion. If an exclosure becomes necessary under these terms, it shall be designed in cooperation with the Service and the Arizona Game and Fish Department.

d. Construct an exclosure that includes the Oak Grove Spring and moist stringer or meadow complex (see earlier definition) on Oak Grove Spring Canyon and its tributary streams in T 21 S, R 16 E, E½ Sec. 36. The exclosure shall be approximately 0.75 to 1.2 km (0.5-0.75 mi) long, include both major tributaries of Oak Grove Spring Canyon, and include sufficient upland to buffer the riparian area. The exact location of fences shall be determined on-the-ground in consultation with the Service and Arizona Game and Fish Department. Pass-through openings for hikers may be installed in the exclosure and a small gate (too narrow for a standard vehicle) may be installed for removal of livestock that enter the exclosure. This exclosure shall be in place no later than two years from the date of this opinion. Providing that surface water (judged sufficient for Gila topminnow survival by Service, Forest Service, and Arizona Game and Fish Department fish biologists) has developed, no later than three years after completion of this exclosure, and in cooperation with the Service and Arizona Game and Fish Department, transplant a sufficient stock of Gila topminnow from the falls area or below into the habitat at Oak Grove Spring.

e. Within one year of the date of this opinion, survey in coordination with Arizona Game and Fish Department and initiate removal if present of all nonnative aquatic vertebrate species from the stock tank in the tributary of upper Oak Grove Canyon in T 21 S, R 16 E, NE¼ Sec. 36. Funding for implementing this Term and Condition may be made available by the Service, and the project shall be conducted in coordination with the Service and Arizona Game and Fish Department. This project shall be completed no later than two years from the date of this opinion.

f. To ease recolonization of Lampshire Canyon, evaluate removal of the dam or dams located on Lampshire Canyon in T 22 S, R 17 E, Sec. 6. Identify legal and hydrologic implications. If it is determined this can be done legally, without detriment to the hydrology of the canyon and Gila topminnow, and that removal of stored sediment is feasible, accomplish removal within five years from the date of this opinion. Whether or not the dam can be removed, the Forest Service, in cooperation with the Service and the Arizona Game and Fish Department, shall establish a population of Gila topminnow in suitable habitat in Lampshire Canyon using fish from the Redrock Canyon subpopulation determined to be most biologically appropriate. Initial transplants will occur by two years after the date of this biological opinion.

g. To prevent or reduce distribution of predatory and competitive nonnative species into Redrock Canyon, remove all nonnative aquatic vertebrate species from Down under Tank located in the upper reach of Redrock Canyon T 22 S, R 17 E, SW¼ Sec. 15. Once removal is complete, the tank shall be breached so that it no longer holds water, unless it is determined that the tank supports a population of Sonora tiger salamander, in which case further evaluation of management of the tank shall occur between the Forest Service and the Service. Funding for the nonnative removal and dam breaching is already available from the Service. The project shall be implemented in coordination with the Service and the Arizona Game and Fish Department. This project shall be completed within two years of the date of this opinion. If it is determined that the San Rafael permittee requires water at this site for livestock, then an alternate source of water shall be developed, in coordination with the Service, that does not involve an earthen tank and that would eliminate or reduce nonnative species habitat.

h. Inspect all other earthen stock tanks and ponds on National Forest lands in the Redrock Canyon watershed to determine presence or absence of nonnative aquatic vertebrate species. If such species are found, initiate removal of these species in cooperation with the Service and the Arizona Game and Fish Department. The inspections shall be completed within five years of the date of this opinion and removals implemented within seven years.

i. Increase inspection and maintenance on the four existing exclosures from the twice a year required by the Arizona trail biological opinion to three times a year. Inspect and maintain all new exclosures a minimum of three times a year. Inspection reports from the permittees may be used to accomplish this term and condition. The permittees will report their inspection and maintenance work to the District annually. Livestock will be removed from any exclosure immediately upon learning that they have intruded into the exclosure. Notification will be provided to the Service of any exclosure fence damage and any livestock intrusion into the exclosures within one month after the event.

j. During any activities that involve work in the stream channel (fence, road, or water development activities), all reasonable efforts shall be made to minimize activities within the channel. No heavy equipment shall be used within wetted areas or channels. All reasonable efforts shall be made to ensure that no pollutants enter surface waters during any activities.

2. The following terms and conditions will implement reasonable and prudent measure 2.

a. To prevent accelerated habitat damage during dry periods, implement the Forest's drought policy to reduce livestock grazing impacts in Redrock, Alamo, Corral, Dark, and Monkey Canyons during dry years. Criteria for defining "drought" and the policy for reductions shall be subject to approval by the Service. This policy shall be in place no later than six months from the date of this opinion.

b. To control cumulative adverse effects of roads in Redrock Canyon, any road or track which is constructed, or otherwise opened after January 1997 for use in managing livestock or creating or servicing livestock infrastructure, such as fences and water supplies, shall be closed immediately after use. All use shall be proscribed, except that minimally necessary for livestock management maintenance. Wherever possible the road or track should be ripped and revegetated. The extension of Forest Road 4609, which was created in 1998 to allow for drilling of a well for livestock water on the Crittenden allotment, is included in these provisions, except that it is recognized that the road extension will not be ripped and revegetated.

c. Implement the annual interagency cumulative and aggregative impacts review that was required by the Arizona Trail opinion. This group should include the Forest Service, Service, and Arizona Game and Fish Department.

d. Conduct a cumulative and aggregative analysis of the water usage in Redrock Canyon and its possible effects on streamflow in the main channel or tributaries. If results indicate that surface flows are or may be impacted by the water usage, prepare and implement a plan to reduce impacts and restore surface flows. The analysis shall be subject to approval by the Service. The analysis shall be completed no later than one year after the date of this biological opinion. If a reduction and restoration plan is found necessary, that plan shall be completed and under implementation within three years of this biological opinion.

3. The following terms and conditions will implement reasonable and prudent measure 3.

a. At all times when range project activities such as fence construction, road work, or water development or improvement are ongoing in or within 45 m (150 ft) of any surface water in the Redrock Canyon stream channel or tributaries, a biological monitor shall be present to monitor for the presence of dead or dying fish within the surface waters downstream of the project activity. The Service and Arizona Game and Fish Department shall be notified immediately by telephone or e-mail upon detection of more than 20 dead or dying fish. This does not apply to activities associated with routine fence maintenance.

b. At no longer than five year intervals, repeat the stream channel and fish habitat survey conducted in 1989 and 1996 (Stefferud 1989 and 1996). A copy of the report shall be furnished to the Service as part of the annual report on this consultation.

c. The channel cross-section and vegetation transect monitoring begun after the Arizona Trail biological opinion in 1992, shall be resumed and conducted every five years. It will be done in conjunction with the stream channel and fish habitat survey addressed in 3b (above). A copy of the report of this monitoring shall be part of the annual report to the Service on this consultation.

4. The following terms and conditions will implement reasonable and prudent measure 4.

a. Records of exclosure and gap fence monitoring and maintenance shall be maintained. In addition to the immediate notification to the Service, a report on exclosure maintenance, repair, livestock intrusion, and other relevant information will be furnished to the Service as part of the annual report on this consultation.

b. In the annual report described in the general terms and conditions in this biological opinion, the Forest Service shall briefly summarize for the previous calendar year; 1) implementation and effectiveness of the terms and conditions, 2) documentation of take, if any, and 3) actual livestock use (head, animal months, dates of pasture use, utilization measurements, etc.) with a description of any variations from the proposed action. If other monitoring or research is completed pertaining to Gila topminnow or conditions of rangeland, riparian areas or soil, a copy of the relevant reports shall be included.

c. Ensure that the Service has copies of all NEPA documents and section 7 reports done for projects in Redrock Canyon initiated after the 1990 Redrock Action Plan.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the ESA direct Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for Gila topminnow. In furtherance of the purposes of the ESA, we recommend implementing the following actions:

1. When the Seibold, Kunde, Crittenden, and Papago allotments undergo allotment management plan revision and NEPA analysis in three years, that analysis should consider the four allotments as a unit for their effects to Redrock Canyon and to Gila topminnow. In addition, the effects from the ongoing livestock use on the San Rafael allotment in Redrock Canyon and Gila topminnow should be considered in the analysis of effects for the four allotments under consideration (Recovery Plan Task 1.4, Weedman 1998).

2. Due to the importance of the Redrock Canyon drainage to Gila topminnow and 15 other rare or sensitive species and to the degraded conditions and demonstrated difficulty in improving those conditions with continued livestock grazing, the Forest Service should consider removing the entire watershed of Redrock Canyon (excluding Harshaw Canyon) from livestock grazing. This would allow more latitude in dealing with impacts from the expected increases in recreational use due to the removal of cumulative impacts (Recovery Plan Task 1.4, Weedman 1998).

3. The Forest Service should work toward acquiring or consolidating private lands in the watershed of Redrock Canyon, especially Cott Tank, either through purchase, land exchange, or donation (Recovery Plan Task 1.4, Weedman 1998).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service request notification of implementation of any conservation actions.

YAQUI CHUB (*Gila purpurea*)

Status of the Species

The Yaqui chub was listed as an endangered species on August 31, 1984. Critical habitat was designated for this species for "all aquatic habitat on the San Bernardino NWR" (USFWS 1984c). However, this was before the acquisition of Leslie Canyon, and Leslie Canyon is not designated critical habitat. The Yaqui chub is a medium sized fish of the family Cyprinidae (Minckley 1973). Until recently, *Gila purpurea* was thought to occur in the basins of the Ríos Sonora, Matape, and Yaqui in Arizona and Sonora, México (Hendrickson et al. 1980). In 1991, it was recognized that the chub in the Ríos Sonora and Matape and the Río Yaqui system downstream from San Bernardino Creek is a different species, *Gila eremica* (DeMarais 1991). *Gila purpurea* is endemic to San Bernardino Creek in Arizona and México and probably the Willcox Playa basin in Arizona (Varela-Romero et al. 1990, DeMarais 1991). It currently occurs in Bathhouse Spring, Black Draw, House Pond, Mesquite Pond, North Pond, Oasis Pond, Robertson Ciénega, Twin Pond, and Two PhD Ponds on the San Bernardino National Wildlife Refuge (SBNWR memorandum May 26, 1994). Only a few individual chubs were caught in Robertson Ciénega during the 1994 monitoring effort. Some of those populations have been stocked into enhanced or artificially created habitats as part of the recovery program. The population in Leslie Creek was stocked in 1969 with individuals taken from Astin Spring (Minckley and Brooks 1985). A population in Turkey Creek in the Chiricahua Mountains was stocked in 1986 and 1991 from Astin Spring (via Leslie Creek) stock raised at Dexter National Fish Hatchery.

Habitat preferences for Yaqui chub vary by life stage. Young fishes prefer marginal habitats and the lower ends of riffles. Adults prefer the deepest, most permanent pools, undercut banks next to large boulders, debris piles, and roots of large riparian trees (Hendrickson et al. 1980). Diet consists mostly of algae, insects, and detrital material (Galat and Gerhardt 1987).

Breeding males are a bluish-grey color while females are straw-yellow to light brown color (Minckley 1973). Spawning is protracted throughout the warmer months, with greater activity in spring. Reproductive potential is high and large populations develop quickly from a few adults (DeMarais and Minckley 1993). Growth to maturity is rapid, often within the first summer of life.

Decline of the Yaqui chub probably began with regional arroyo cutting in the late 1800s. Rio San Bernardino incised its floodplain more than 8 m (25 ft), and streamside marshlands (cienegas) were drained, except where locally maintained by springs or artesian wells. Cattle grazing destroyed cienegas and wetlands and contributed to watershed deterioration. It approached extinction in the late 1960's, due to habitat loss, but survived largely due to human intervention, including transplantation, hatchery production, habitat acquisition, renovation, creation, and reintroduction. Catastrophic drought in the mid-1970s further depleted populations (DeMarais and Minckley 1993).

Actions taken at San Bernardino National Wildlife Refuge help maintain populations of the species in the United States. Yaqui chub populations in West Turkey Creek occur largely on the private El Coronado Ranch. Conservation, ranch management, and recovery actions for the Yaqui chub, Yaqui catfish (*Ictalurus pricei*), and longfin dace are laid out in a 25-year long Habitat Conservation Plan. Management in Mexico is minimal at best.

Environmental Baseline in the Action Area

An historic record exists for Yaqui chub in West Turkey Creek (Rutter 1896). However, the specimens' identity cannot be confirmed because they were lost in the San Francisco earthquake (Miller and Lowe 1964). After that collection, the species was not collected there again. Although the Yaqui chub occurs in West Turkey Creek and is considered a native, the species had disappeared from the Creek sometime early in this century from either natural conditions (drought, floods, wildfire, watershed degradation) or elimination due to competition with introduced nonnative fishes (rainbow trout, green sunfish).

In 1986, Yaqui chub from stocks at the Dexter National Fish Hatchery were transplanted to ponds on the University of Arizona's Coronado Ranch. The stock of these fish was originally from Astin Spring via Leslie Creek. The chub eventually dispersed from the El Coronado Ranch ponds into West Turkey Creek. The El Coronado Ranch ponds function as a refugium and a source of chub for West Turkey Creek. Nonnative species are one of the biggest threats to the West Turkey Creek native fishes. Illegal release of nonnative aquatic species will probably be a continual problem.

Electrofishing surveys conducted by the Service and Coronado National Forest in 1996, 1997, and 1998 within the upper reaches of West Turkey Creek found Yaqui chub in low numbers (2 to 19 individuals) but surviving and reproducing. Since Yaqui chub fry and young of the year were found during these surveys, suitable habitat conditions must exist.

During the 1996-1998 surveys, nonnative species were also found on the Forest. However, their distribution and composition have been variable. The 1996 surveys found rainbow trout along with longfin dace and Yaqui chub. The 1997 results reflected a significant presence of fathead minnow along with Yaqui chub, but no trout nor dace. No nonnative species nor longfin dace were found in 1998. Surveys were confined to pool habitat within the upper 1.6 km (1.0 mi) of West Turkey Creek.

West Turkey Creek is one of two "perennial" streams on the western side of the Chiricahua Mountains in the Coronado National Forest that drain into the Sulphur Springs Valley. Rucker Canyon also contains perennial water. It is thought that these drainages were once tributaries to the Rio Yaqui in Sonora, Mexico. About 6.4 km (4.0 mi) of potential Yaqui chub stream habitat exist within West Turkey Creek. Of this, approximately, 4 km (2.5 mi) of stream habitat are within National Forest lands. This 4 km (2.5 mi) of stream are within the Turkey Creek Allotment. The stream is perennial-intermittent. In severe droughts only a few of the deeper

pools are left. Ponds on private land of the El Coronado Ranch also serve as refugia during drought and as the best habitat for the chub in the West Turkey Creek watershed.
A Section 10 permit was issued in 1998 approving the Habitat Conservation Plan for the El Coronado Ranch (Minckley and Duncan 1998). The goals of the HCP include watershed management, improving riparian condition, allow continued operation of the ranch, and conservation and recovery of native species. The Section 10(a)(1)(B) permit covers incidental take of Yaqui chub, Yaqui catfish, and the Yaqui form of longfin dace, should it ever be listed. Implementation of the HCP should lead to improved watershed and habitat conditions for native fish in the watershed. Management on the El Coronado Ranch under the HCP will improve the baseline by:

- Managing water diversions to maintain a balance of water supply in both West Turkey Creek and ponds to enhance survival of Plan Species;

- Allowing routine maintenance at Applicant expense on all components of the water-delivery system and ponds to ensure they remain in good repair;

- Maintaining water levels and biological conditions in ponds where fishes of concern are to ensure adequate habitats to the extent possible given the variable water supply from West Turkey Creek. To the extent possible, avoid reintroduction of and eliminate non-indigenous predators and competitors of resident populations of chub and other plan species;

- Implementing plans that minimize adverse impacts of livestock grazing in the watershed on native fish habitats or indigenous fishes;

- Avoiding adverse modifications to the watershed on private land that may negatively influence native fish habitats or indigenous fishes;

- Allowing agency personnel access to the El Coronado Ranch on reasonable notice where necessary for monitoring, sampling, research and other activities including translocation and reintroduction of fishes, when related to management of species and habitats of concern.

Besides the West Turkey Creek aquatic resources, Forest Road 41 more or less parallels the Creek, ending with a trailhead at the Wilderness boundary. This is one of four trailheads that access wilderness recreation trails from West Turkey Creek. Also, along with the El Coronado Ranch, there are 14 recreational summer homes, two semi-developed campgrounds, and several dispersed camping sites in use within the Canyon on Forest Service lands. The West Turkey Creek Native Fish Habitat Renovation Project underwent formal consultation on February 4, 1999 (2-21-99-F-130). Its goal is to maintain West Turkey Creek as a native fishery and remove nonnative fishes. Two treatments have conducted so far, apparently successfully (W. Minckley, pers. comm., 1999).

In 1994, because of the Rattlesnake Fire, significant quantities of ash and other debris were transported downstream into West Turkey Creek. Nevertheless, the resident nonnative rainbow trout, and natives longfin dace and Yaqui chub survived. However, the event did not impact the watershed equally. The majority of the debris flows affected the lower reaches of West Turkey Creek via Saulsbury and Ward Canyons. The watershed still is continuing to heal and recover.

The Turkey Creek Grazing Allotment is permitted to the El Coronado Ranch. Permitted use is for 66 cow/calf yearlong and an additional 25 cows from September through December. The grazing system involves a "Best Pasture" system. In 1997, the permittee took non-use because of drought and in 1998, only 25 percent of the permitted use was applied for. Cattle are not excluded from West Turkey Creek. No grazing occurs within the West Turkey Creek Recreation Area (=Yaqui chub habitat) during the summer months, but grazing is allowed in the fall and winter. Use any other time tends to be transitory because there is little forage produced in that area (Marcello Martinez, USFS, pers. comm., Feb. 24, 1999). Most livestock use is on the allotment in the watershed above Turkey Creek, including its tributaries.

Range condition on the allotment is moderately low or better, with most of the hectares [~3,600 (>9,000 ac)] in this category. The trend is static or up, with about 1,100 ha (2,800 ac) in a static trend. Soil condition on the allotment is 96 percent satisfactory.

Effects of the Action

Livestock grazing can cause direct and indirect effects to fish and their habitat. It has long been acknowledged that grazing has had adverse impacts to native southwestern fishes (Chamberlain 1904, Miller 1961, Hendrickson and Minckley 1984, Minckley 1985, Williams et al. 1985, Marsh and Minckley 1990, Minckley et al. 1991a, Rinne and Minckley 1991). Cattle can directly affect fish through trampling fish, larvae, and eggs, and though ingestion of eggs and larvae (Roberts and White 1992). Yaqui chub will be directly affected by the proposed action because cattle have access to the habitat occupied by Yaqui chub. Impacts from livestock should be small, because grazing may not occur every year, the area of occupied habitat is grazed only in the winter, and the number of livestock are few. The effects of livestock grazing are also discussed in the GILA TOPMINNOW and HUACHUCA WATER UMBEL sections.

Indirect effects include alteration of riparian and aquatic habitats and changes to watershed functioning. Livestock grazing alters the species composition of communities, disrupts ecosystem functioning, and alters ecosystem structure (Fleischner 1994). The main impacts to an ecosystem are from cattle grazing of plants and trampling vegetation and soil (Marlow and Pogacnik 1985). These impacts can affect both riparian zones and uplands. These impacts can indirectly affect Yaqui chub.

The proposed grazing management may negatively impact upland and riparian soils, by affecting the vegetative ground cover, plant vigor, and litter components. However, if it is implemented as it has been, conditions should improve or remain static. Riparian soil and bank stability should continue to improve (Skovlin 1984, Kovalchik and Elmore 1992). Winter grazing impacts to riparian areas are usually less than grazing during other seasons (Platts 1989, 1990; Kovalchik and Elmore 1992). Since soil and range condition on the allotment is moderate or better, the indirect effects of grazing in the watershed are minimal. Vegetation utilization of 45 percent is allowed under the present plan. Research summarized by Holechek et al. (1998) suggest that 45 percent utilization may be to high for the vegetation types present on the Turkey Creek allotment.

The indirect effects of livestock grazing will be minimal to Yaqui chub, occupied or potential habitat, and on the watershed above habitat. The only livestock grazing that occurs is around the upper end of West Turkey Creek. Livestock rarely venture into areas higher up in the watershed, because it is steep, heavily wooded, and does not produce much forage.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation following section 7 of ESA.

Most future actions in the watershed will be on Federal lands, and thus would be subject to Section 7. Actions on the El Coronado Ranch have been identified for a 25-year period. The illegal transplanting of exotic fish and amphibians will probably continue. This situation will require periodic habitat monitoring. The drainage may also be closed to fishing by the Arizona Game and Fish Commission.

Conclusion

After reviewing the status of the Yaqui chub, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the on-going and long-term grazing, as proposed, is not likely to jeopardize the continued existence of the Yaqui chub. Critical habitat for this species has been designated at the San Bernardino National Wildlife Refuge, however, this action does not affect that area and no destruction or adverse modification of that critical habitat is anticipated.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by FWS as intentional or negligent actions that create the likelihood of injury to listed

species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions of the incidental take statement through enforceable terms added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Forest Service must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE

Based on the proposed on-going and long-term grazing and on the analysis of the effects of the proposed action provided above, the Service anticipates that the following take may occur because of the proposed action:

On-site incidental take is anticipated to result from harassment and direct and indirect mortalities due to management actions. Incidental take will be difficult to detect for the following reasons: live and dead fish are difficult to find, cause of death may be difficult to determine, reliable population estimates are not obtainable due to sampling difficulties, and losses may be masked by seasonal fluctuations in numbers or other causes. Incidental take from actions proposed on the National Forest, is likely to be small since known populations of Yaqui chub on the Forest are also small. The causes and forms of take are described below. It is anticipated that not more than five Yaqui chub will undergo take annually. Take may occur through harm and harrassment from cattle in the riparian and aquatic habitat of the creek; or by killing chub when cattle cross or water at occupied habitat.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize take of the Yaqui chub:

1. Conduct the proposed action in a way that will minimize mortality of Yaqui chub.
2. Monitor the effects of the proposed action on the Yaqui chub and its habitat.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with. These terms and conditions are nondiscretionary.

1. The following term and condition implements reasonable and prudent measure 1.

   The Forest Service shall insure implementation of the proposed action as written.

2. The following terms and conditions implement reasonable and prudent measure 2.

   The Forest Service shall monitor fish populations and habitat conditions in coordination with other monitoring activities occurring in the watershed: the El Coronado Ranch Habitat Conservation Plan, the West Turkey Creek Native Fish Habitat Renovation Project, and the Johnson Peak fire plan. Monitoring requirements that apply to the Forest from these plans include: for the HCP, sections 11.6.C and 11.6.D of the Implementing Agreement; and for the renovation project, term and condition 2.1 and 3 from the biological opinion. The biological opinion for the fire plan is not complete.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes incidental take would be exceeded if the more than five Yaqui chub undergo take. If incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Sections 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Other actions occurring in the West Turkey Creek watershed need to be analyzed for their potential impacts to listed species. Impacts from the different forms of recreation occurring in the watershed are probably more detrimental to the Yaqui chub and the watershed than actions previously consulted on. A watershed plan may be an appropriate means of addressing the issues. The Forest Service should cooperatively work with the Service and interested parties to address these issues (Recovery plan task 2.0, USFWS 1995c:23).

2. The Forest should work with the El Coronado Ranch, Arizona Game and Fish Department, and the Service to designate West Turkey Creek as a native fishery, and close it to fishing (Recovery plan task 2.0, USFWS 1995c:23).

3. The Forest should assist with the development of a monitoring plan that addresses all actions occurring the watershed (Recovery plan task 2.0, USFWS 1995c:23).

SONORA TIGER SALAMANDER (*Ambystoma tigrinum stebbinsi*)

Status of the Species

The Sonora tiger salamander is a large salamander with a dark venter and light-colored blotches, bars, or reticulation on a dark background. Snout-vent lengths of metamorphosed terrestrial salamanders vary from approximately 6.6 to 12.4 cm (2.6-4.9 inches) (Lowe 1954, Jones et al. 1988). Larval salamanders are aquatic with plume-like gills and well-developed tail fins (Behler and King 1980). Larvae hatched in the spring are large enough to metamorphose into terrestrial salamanders from late July to early September, but only an estimated 17 to 40 percent metamorphose annually. Remaining larvae mature into branchiates (aquatic and larval-like, but sexually mature salamanders that remain in the breeding pond) or over-winter as larvae (Collins and Jones 1987; James Collins, Arizona State University, pers. comm., 1993). The Sonora tiger salamander was listed as endangered on January 6, 1997. No critical habitat has been proposed or designated. A recovery plan is currently in preparation by Dr. James Collins and Jon Snyder, Arizona State University. A Participation Team of stakeholders and other individuals knowledgeable about the salamander and its habitat are assisting Dr. Collins and Mr. Snyder. Several Forest allotment permittees are members of the Participation Team.

The Sonora tiger salamander is known from approximately 50 breeding localities (Collins and Jones 1987, Collins 1996, USFWS 1997a, Abbate 1998, Ziemba et al. 1998, Jon Snyder, Arizona State University, pers. comm., 1999; Mike Pruss, Arizona Game and Fish Department, pers. comm., 1999); although at any one time not all these sites are occupied. During intensive surveys in 1997, from 1 to 150 Sonora tiger salamanders were found at 25 stock tanks (Abbate 1998). Populations and habitats are dynamic, thus the number and location of extant aquatic populations changes over time, as exhibited by the differences between survey results in 1985 and 1993 to 1997 (Collins and Jones 1987, Collins 1996, James Collins, pers. comm., 1996, Abbatte 1998, Ziemba et al. 1998). Some sites that once supported salamanders are now inhabited by nonnative predators that preclude recolonization.

Salamanders that may be Sonora tiger salamanders have also been found at the lower Peterson Ranch tank in Scotia Canyon, upper Garden Canyon Pond at Fort Huachuca, and at Los Fresnos in the San Rafael Valley, Sonora. Salamanders have not been found at the Scotia Canyon site for several years; this population may be extirpated. Additional reports of the salamander from one mine, one cave, and one spring-fed well have yet to be confirmed (Ziemba et al. 1998). All sites where Sonora tiger salamanders have been confirmed are in the San Rafael Valley and adjacent portions of the Patagonia and Huachuca mountains in Santa Cruz and Cochise counties, Arizona. All confirmed historical and extant aquatic populations are found in cattle tanks or impounded cienegas.

Because nearly all occupied and potential salamander breeding habitats are used as livestock watering holes, the fate of the salamander is meshed with that of livestock grazing in the San Rafael Valley and adjacent areas. Historically, the Sonora tiger salamander probably inhabited springs, cienegas, and possibly backwater pools that were extant long enough to support breeding and metamorphosis (at least two months), but ideally were permanent or nearly permanent, allowing survival of mature branchiates. The grassland community of the San Rafael Valley and adjacent montane slopes, where all extant populations of Sonora tiger salamander occur, may represent a relictual grassland and a refugium for grassland species. Tiger salamanders in this area became isolated and, over time, genetically distinct from ancestral *A. t. mavortium* and *A. t. nebulosum* (Jones et al. 1995). *Ambystoma t. stebbinsi* has opportunistically taken advantage of available stock tank habitats as natural habitats disappeared (Hendrickson and Minckley 1984) or were invaded by nonnative predators with which the salamander cannot coexist (USFWS 1997a).

Primary threats to the salamander include predation by nonnative fish and bullfrogs, a viral disease, catastrophic floods and drought, illegal collecting, introduction of other subspecies of salamanders that could genetically swamp *A. t. stebbinsi* populations, and stochastic extirpations or extinction characteristic of small populations with low genetic variability. Predation by catfish, bass, mosquitofish, and sunfish can eliminate stock tank populations of Sonora tiger salamander (Jonathan Snyder, Arizona State University, pers. comm., 1996; Collins et al. 1988). Crayfish are currently known from only one tank with salamanders, but it is suspected that crayfish would prey on larval salamanders and eggs. Crayfish are apparently spreading through the Bear and Lone Mountain canyon areas and may become increasingly common in the range of the salamander (J. Rorabaugh, Service, Phoenix, pers. obs., 1999). The salamander can apparently coexist with bullfrogs, but bullfrogs prey on salamanders (J. Snyder, pers. comm., 1996) and perhaps if they are present in sufficient densities could reduce salamander populations. Tadpoles of wood frogs, *Rana sylvatica*, are known to feed on spotted salamander, *Ambystoma maculatum*, eggs (Petranka et al. 1998), but under experimental conditions bullfrog tadpoles do not feed on viable salamander eggs or hatchlings (Collins 1996, J. Collins, pers. comm., 1996).

A disease, recently identified as an iridovirus, has been documented at many tanks in the San Rafael Valley (Jancovich et al. 1998). Once introduced to a stock tank, most or all aquatic salamanders die (Collins et al. 1988, Jancovich et al. 1998). Birds, cattle, or other animals that move among tanks may spread the disease (Jancovich et al. 1998). Anglers or researchers could also spread the disease if equipment such as waders and nets used at a salamander tank are not disinfected or allowed to thoroughly dry before use at another tank. Diseased salamanders were found at two tanks in 1997 (Abbate 1998).

Ambystoma tigrinum mavortium and *stebbinsi X mavortium* crosses have recently been confirmed for the first time at seven stock tanks in the San Rafael Valley. Five tanks contained mixes of *stebbinsi* and *mavortium* mitochondrial genotypes, while two tanks contained *mavortium*-like salamanders (Ziemba et al. 1998). Thus, genetic swamping of *stebbinsi* populations may be underway. Analysis suggests very little genetic variability in Sonora tiger salamanders (Jones et al. 1988, Jones et al. 1995, Ziemba et al. 1998). In populations with low genetic variability lethal alleles are more likely to be expressed, disease resistence may be low, and evolution and adaptation to a changing environment is relatively slow.

For further information on the ecology, taxonomy, range, and threats to this subspecies, refer to Collins (1981, 1996), Collins and Jones (1987), Collins et al. (1988), Gehlbach (1967), Jancovich et al. (1998), Jones et al. (1988, 1995), Lowe (1954), Snyder et al. (1996, 1998), and Ziemba et al. 1998.

Environmental Baseline in the Action Area

The Forest requested formal consultation regarding effects to the salamander on 15 allotments, all of which are in the Huachuca EMA. Of these 15, Sonora tiger salamanders have been found on eight allotments. Salamanders have been recorded on an additional two allotments (A-Draw and Collins Canyon). The A-Draw allotment is being addressed in another ongoing formal consultation between Region 3 of the Forest Service and the Service's Region 2. Under the current proposal, Collins Canyon allotment would not be grazed, and thus no effects to the salamander would occur (Carol Boyd, Coronado National Forest, Tucson, pers. comm., March 9, 1999). Information on all 17 allotments, including number of salamander localities, status of populations, land ownership of tanks, allotment range condition and trend, and soil condition is presented in Table 24.

Forty-three of the 50 known Sonora tiger salamander localities are found within Forest Service allotments. The remaining sites occur on the Sharp Ranch, now owned by the Nature Conservancy and Arizona State Parks. Allotments in formal consultation contain 40 localities. Thus, the proposed action affects most of the breeding sites, historic and current, of the Sonora tiger salamander.

Effects of the Action

Thirty localities are on Forest lands in the allotments under consultation; however, effects of the action likely affect all 40 localities within the allotments. Management of the allotments is driven by forage availability, water sources, terrain, and other considerations that characterize most of each allotment. All of the allotments are largely (apparently >70 percent, and often >90 percent) in public ownership (remaining lands are privately owned). Thus, management of grazing on many or most of the private inholdings within the allotments is likely affected by how the public lands are grazed, and as a result, grazing on the private lands within the allotments are likely interrelated and interdependent to grazing on the public lands. According to the definition of the "effects of the action" (which includes effects of interrelated and interdependent activities - 50 CFR 402.02), effects of grazing on both public and private portions of the allotments are considered herein as effects of the action.

The effects of grazing activities on the salamander have been the subject of several previous consultations and a conference, including: 1) August 14, 1995, letter from the Service concurring that construction of 4.5 km (2.8 mi) of electric fence on the San Rafael allotment is not likely to jeopardize the continued existence of the Sonora tiger salamander (a conference, file 2-21-95-I-383); 2) September 18, 1995, letter from the Service concurring that issuance of

Table 24. Information on allotments on the Coronado National Forest in which grazing is likely to adversely affect the Sonora tiger salamander.

Allotment	# Salamander localities by ownership[1]	Salamanders documented in last 5 years?[2]	Range condition and trend[3] High	Mod High	Mod Low	Low	Soil condition[4]
A-Draw	2(FS)	Y(2)	0	20S	80S	0	70/0/0/30
Bender	None	None	0	95S	5U	0	90/5/5/NA
Blacktail	2(FS)	Y(2)	0	0	100S	0	10/90/NA/NA
Campini	3(FS)	Y(3)	0	100U	0	0	40/25/NA/35
Collins Canyon	1(FS)	Y(1)	0	10U 5S	0	90 D	*No grazing activities proposed*
Duquesne	1(FS), 2(P)	Y(3)	0	0	100S	0	55/45/NA/NA
HQ	2(FS)	Y(2)	0	80U	20S	0	15/85/NA/NA
Harshaw	None	None	0	100S	0	0	95/5/NA/NA
Hayfield	1(FS), 1(P)	N(2)	0	80S	20S	0	10/90/NA/NA
Lochiel	None	None	0	0	100S	0	70/30/NA/NA
Lone Mountain[5]	7(FS), 1(P)	Y(8)	0	75U	15U 10S	0	60/30/NA/10
Parker Canyon[5]	6(FS), 1(P)	Y(6FS), N(1P)	0	5S	95S	0	60/30/NA/10
Lyle Canyon	None	None	0	60S	40S	0	30/50/NA/20
San Rafael	6(FS), 3(P)	Y(5FS, 1P), N(1FS,1P)	0	0	70D	30D	15/35/50/NA
Santa Cruz	None	None	0	35S	65S	0	25/75/NA/NA
Sawtelle	None	None	0	100S	0	0	50/50/0/0
U-D	None	None	0	100S	0	0	20/80/0/0

[1] Number of stock tanks in allotment where Sonora tiger salamanders have been found by land ownership - Forest Service (FS) or private (P)
[2] Salamanders have (Y) or have not (N) been documented at the tank(s) (number of tanks shown in parentheses) within the last 5 years
[3] Range condition (percent of the allotment in high/moderately high/moderately low/low)and trend (upward [U], downward [D], or static [S]) by. NA=not applicable
[4] Soil condition in percent of the allotment in satisfactory/unsatisfactory/impaired/unsuited condition. NA=not applicable
[5] Range condition and trend, and soil conditions are for both the Lone Mountain and Parker Canyon allotments, which are operated by the same permittee.

grazing permits on the Duquesne and Campini allotments are not likely to jeopardize the continued existence of the salamander (a conference, file 2-2-95-I-412); 3) June 17, 1997, concurrence that sediment removal from two tanks on the Lone Mountain allotment may affect, but is unlikely to adversely affect the salamander (file 2-21-97-I-296), and 4) December 19, 1997, biological opinion on Land and Resource Management Plans, as amended, for Eleven National Forests and National Grasslands in the Southwestern Region.

The December 19, 1997, biological opinion addressed grazing at a plan level, rather than site-specifically, as addressed herein. The opinion found that grazing and other activities proposed were not likely to jeopardize the continued existence of the salamander. That opinion provided several terms and conditions to minimize take, including detailed protocols on how to maintain or clean out stock tanks where the salamander may occur.

Salamander breeding occurs in livestock tanks, most of which are in Forest Service allotments. These tanks require periodic maintenance to remain viable as both salamander breeding sites and as functional livestock waters. Thus, the survival of the salamander is currently intertwined with that of the Forest's grazing program, and depends on periodic maintenance of livestock waters. Although the salamander requires the tanks for breeding, the livestock program may adversely affect the salamander. These adverse effects include: 1) trampling or ingestion of metamorphs, aquatic branchiates and larvae, and eggs; 2) trampling and browsing of vegetation at and near tanks, resulting in reduced salamander escape cover, and reduced cover and forage for invertebrates that the salamander preys on; 3) adverse effects to salamanders due to increased turbidity and reduction of aquatic cover and egg deposition sites at tanks due to cattle wading into the water; 4) increased likelihood of disease transmission; 5) watershed degradation and resulting increased runoff and sedimentation, requiring more frequent maintenance of tanks; 6) construction of range projects that may result in direct mortality of terrestrial salamanders or that facilitates access to tanks with subsequent increased chance of introduction of nonnative predators, collection or translocation of salamanders, and disease transmission; and 7) maintenance of stock tanks; which although is needed for stock tanks to remain as viable breeding habitats, can result in injury or mortality of salamanders. We discuss these seven effects below.

1) Trampling or ingestion of metamorphs, aquatic branchiates and larvae, and eggs: This effect has not been documented, but likely occurs when cattle water at tanks. While drinking, cattle may ingest eggs or small larval salamanders that cannot escape rapidly. Small larvae and eggs, which are often deposited on aquatic vegetation, branches, or on the pond substrate, could also be easily trampled by cattle that wade into a tank. Larger larvae and adult branchiate and metamorph salamanders are more mobile and would likely escape trampling, but may occasionally be killed or injured as well.

2) Trampling and browsing of vegetation at and near tanks, resulting in reduced salamander escape cover, and reduced cover and forage for invertebrates that the salamander preys upon: Many tanks where the salamander occurs are devoid of shoreline vegetation, and the land beside the tank may be denuded for several to many meters away from the water due to trampling and browsing by cattle. This demonstrates that salamanders can exist under these conditions, but populations might be more robust if shoreline cover was enhanced. Shoreline cover may provide some protection from predation for terrestrial salamanders, and may also harbor insects and other invertebrates that the salamanders prey upon. However, the shoreline cover could also harbor small predators, such as garter snakes and bullfrogs, that could feed on salamanders, offsetting benefits of enhanced cover for the salamander.

3) Adverse effects to salamanders due to increased turbidity and reduction of aquatic cover and egg deposition sites at tanks due to cattle wading into the water: Tanks where salamanders breed are almost always very turbid. Cattle wading into the tanks, combined with erosion and runoff from denuded and trampled soils immediately next to the tanks, no doubt contribute to these high turbidity levels. The effects of high turbidity on the Sonoran tiger salamander have not been researched; however, Lefcort et al. (1997) examined the effects of silt on growth and metamorphosis of larval mole salamanders (*Ambystoma opaceum* and *A. tigrinum tigrinum*). Salamanders in silty water grew more slowly, metamorphosed sooner, and were more susceptible to infection by a water mold (*Saprolegnia parasitica*) than salamanders in non-silty water.

4) Increased likelihood of disease transmission: Approximately eight percent of aquatic populations experience die-offs each year in which all or most salamanders and larvae in the pond die (Snyder, pers. comm., 1999). *Ambystoma tigrinum* virus is thought to be primarily responsible (Jancovich et al. 1998). Cattle, humans, birds, invertebrates, or amphibians moving among tanks may carry mud with them, inoculating populations with the virus (Jancovich et al. 1998). Disease transmission via cattle is most likely among adjacent tanks within a pasture where cattle could easily move between tanks. Ranch hands could also carry the disease among tanks via muddy boots or equipment. Although the disease can result in large mortality events, the effect on the survival of populations or the subspecies is less clear because tanks that disease decimates are typically recolonized via breeding terrestrial metamorphs or surviving aquatic morphs (Jancovich et al. 1998). However, at a minimum, such events will decrease the likelihood of population persistence and likely result in reduced genetic variation and subsequent reduced fitness.

5) Watershed degradation and resulting increased runoff and sedimentation, requiring more frequent maintenance of tanks: As indicated in Table 24, some allotments exhibit degraded range and soil conditions. The San Rafael allotment is of particular concern, where range condition is downward, all of the allotment is in moderately low or low condition, and 80 percent of the soils are either unsatisfactory or impaired. No other allotment has a downward trend, but Santa Cruz and Lyle Canyon allotments have significant percentages of the allotment in moderately low range condition, and several have predominantly unsatisfactory soil conditions (Blacktail, HQ, Hayfield, Lyle Canyon, Santa Cruz, Sawtelle, and U-D.)

The information upon which range and soil conditions is based is often qualitative and may have limited site-specific applicability (Jeanne Wade, pers. comm. 1999). Nevertheless, the relatively high percentages of rangelands in moderately low condition and impaired or unsatisfactory soil conditions on the allotments in Table 24 suggest degraded to very degraded conditions over much of the area inhabited by the Sonora tiger salamander. Degraded vegetation and soil conditions may be caused by current grazing practices or may be an artifact of past grazing practices. Range vegetation and soil conditions may also be degraded by fire and subsequent erosion; changes in fire regimes; roads, off-road vehicles, urban, and other surface-disturbing activities; grazing by wildlife species; drought; floods; introduced nonnative plants, such as Lehmann lovegrass; or combinations of factors (Humphrey 1958, Hastings and Turner 1965, Martin 1975, Brown and McDonald 1995, Wang et al. 1997). However, cattle grazing is the primary human use in the range of the salamander, and although periodic fire can dramatically change vegetation and soil conditions in the area, and recreation and Lehman lovegrass have degraded range condition in parts of the San Rafael Valley, the current soil and range conditions are probably largely caused by grazing.

Trends in range condition are probably even more important than the conditions themselves, because trends reflect effects of current or recent management and events, rather than historic grazing or other past activities. Trends are mostly static, with some areas in an upward trend (Lone Mountain, Parker Canyon, Campini, and HQ allotments), and a downward trend in the San Rafael allotment. Stocking rates on the San Rafael allotment were recently cut from over 700 to 435 cow/calf; thus, range condition trend should begin to improve there. Range condition trend information suggests that current grazing regimes are generally not causing additional degradation, and in some cases, conditions are improving.

The most important immediate effects of degraded rangeland and soil condition on the Sonora tiger salamander probably include watershed degradation and subsequent effects on downstream stock tanks. Disturbance of soils, possibly cryptobiotic crusts, and removal of vegetation in the watershed by grazing combine to increase surface runoff and sediment transport, and decrease in-filtration of precipitation (Gifford and Hawkins 1979, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997). Effects are cumulative and interactive. Loss of vegetation cover and trampling of soils promote deterioration of soil structure, which in turn accelerates vegetation loss (Belsky and Blumenthal 1997.) These changes in the watershed tend to increase peak flows and reduce low flows (DeBano and Schmidt 1989), making stream courses more "flashy". Stock tank water levels depend on periodic runoff from the watershed. Mechanisms that increase runoff (such as watershed degradation) could conceivably result in increased flows and more water in stock tanks. However, increasing flows over conditions in which stock tanks have existed for decades may also lead to relatively high flows over the berms or spillways of such tanks, erosion, and breaching of tanks. Sediment carried off degraded watersheds could also result in increased turbidity and adverse effects to salamanders described in item 3, or could fill tanks and result in a loss of breeding habitat. Head cuts caused by grazing and watershed degradation may also threaten the integrity of stock tanks. Head cuts threaten formerly-occupied salamander sites at the lower Peterson Ranch tank in Scotia Canyon, and at Grennan Tank on the west side of the San Rafael Valley. Head cutting also threatens wetlands inhabited by salamanders (not confirmed as *stebbinsi*) at Los Fresnos, Sonora. Increased maintenance of stock tanks can compensate these effects. (Note: the Service does not advocate repairing the head cut and cleaning the upper Peterson tank, which may be contrary to reestablishing cienega conditions and eliminating nonnative organisms).

In the longer term, degraded vegetation and soil conditions may prevent the restoration of cienega conditions and the natural pools and ponds in which the Sonora tiger salamander must have existed before extensive cattle grazing and development of stock tanks. Cienegas largely disappeared from the San Rafael Valley in the period from the 1860's to the mid-1890's (Hendrickson and Minckley 1984, Hadley and Sheridan 1995). Watershed degradation caused by overgrazing, particularly during the mid 1890's, followed by heavy precipitation no doubt contributed to erosion and loss of wetlands then (Hendrickson and Minckley 1984). However, extensive mining, timber harvest, and a large crown fire during this period (Hadley and Sheridan 1995, Danzer et al. 1997, General Wildlife Services no date) probably also caused severe watershed problems and loss of wetlands in and near the Huachuca Mountains. Construction of stock tanks probably also caused the demise or transformation of some cienegas because some tanks are actually impounded cienegas. Why cienegas have not redeveloped in the San Rafael Valley is not completely understood, but they are not likely to return under conditions of continued degraded vegetation and soil conditions suggested in Table 24. Restoration of some cienega habitats in addition to maintenance of current stock tank habitats would probably enhance the viability of the subspecies.

6) Construction of range projects and other operations that may result in direct mortality of terrestrial salamanders, intentional or unintentional translocations of nonnative predators, or that facilitate access to tanks with subsequent increased chance of introduction of nonnative predators, collection or translocation of salamanders, and disease transmission: Construction of pipelines, fences, corrals, and other surface-disturbing construction activities could potentially result in mortality or injury of salamanders. Terrestrial salamanders could be trampled, crushed by vehicles or equipment, or trapped in burrows if construction activities closed off burrow entrances. Mortality of salamanders could also conceivably occur due to routine inspections and maintenance as permittees or ranch hands drive roads through salamander habitat and may run over salamanders crossing a road. The likelihood of such mortality or injury is unknown, but terrestrial salamanders are almost never encountered on the surface. Death or injury of animals hidden in debris, under logs, or in burrows is probably more likely.

Direct effects to terrestrial salamanders from construction projects or routine operations are most likely to occur close to breeding sites where most terrestrial morphs are encountered. However, a Sonora tiger salamander was captured in a pit fall trap at Oak Spring in Copper Canyon, Huachuca Mountains, by Arizona Game and Fish Department personnel. The nearest known breeding site was approximately 1.0 km (0.6 mi) to the south, suggesting the salamander may have moved at least that far. Capture in a pit fall trap also confirms that the individual was surface active. In other subspecies of *Ambystoma tigrinum*, metamorphs may disperse hundreds of meters from the breeding pond, or may remain nearby (Gehlbach et al. 1969, Petranka 1998). Of hundreds of marked *Ambystoma tigrinum nebulosum,* two were found to move from 1.4 to 1.9 km (0.9-1.2 mi) to new ponds (J. Collins, pers. comm., 1998). On Fort Huachuca, Sheridan Stone (Ft. Huachuca, pers. comm., 1998) reports finding terrestrial tiger salamanders (probably *A. t. mavortium*) 3.0 to 4.0 km (1.9-2.5 mi) from the nearest known breeding pond. Referring to conservation of the California tiger salamander, *A. californiense*, Petranka (1998) finds that, based on studies of movements of other *Ambystoma* species, conservation of a 200 to 500 m (650-1,650 ft) radius of natural vegetation around a breeding pond would protect the habitat of most of the adult terrestrial population.

Road construction, improvement, or maintenance may also facilitate access to tanks where salamanders breed. If public access becomes easier as a result, the likelihood of illegal collection of salamanders and stocking of nonnative salamanders, fish, bullfrogs, or crayfish all increases. Recreationists sometimes drive through tanks, which has been a problem at a salamander breeding site on Fort Huachuca. Salamanders may be killed or injured directly by such activity or adversely affected through increased siltation (see discussion under item 3). Recreationists could also transmit the disease if anglers or vehicles picked up mud at an infected tank and then traveled to another occupied site. Movement of bait fish or salamanders among sites could also spread disease. Construction of a new tank between salamander populations and populations of nonnative predators, particularly bullfrogs and crayfish, could facilitate movement of nonnative aquatic organisms across the landscape with increased invasion and subsequent reductions or extirpation of salamanders at breeding locales.

Water is sometimes hauled to tanks or troughs, especially during drought. If the water source contains fish, bullfrog tadpoles, or crayfish, nonnative predators could be unintentionally translocated and introduced to salamander breeding locales. Ranch hands that are also anglers could also potentially illegally transport live fish or crayfish as bait and introduce them into tanks. Fishing by ranch hands is not part of the Forest's proposed action, but likely would be interrelated and interdependent to the proposed action because the ranch hands probably would not be in the area but for the grazing program. As a result, the effects of fishing by ranch hands would be among the effects of the proposed action.

7) Maintenance of stock tanks; needed for stock tanks to remain as viable breeding habitats; however, can also result in injury or mortality of individual salamanders: As mentioned in item 5, stock tank maintenance can offset some adverse effects of degraded watersheds. Stock tank maintenance is necessary to maintain the breeding habitats of the salamander. However, maintenance activities can also result in direct or indirect effects to salamanders. If salamanders are present during maintenance, equipment may crush animals or they may dessicate if isolated in drying pools. Maintenance may also eliminate bank and aquatic cover and egg deposition sites. Turbidity may increase with possible adverse effects to salamanders described in item 3 above. Typically maintenance is accomplished when tanks are dry or nearly dry. As tanks dry out, many larval salamanders over two months of age and some branchiate salamanders metamorphose and move to upland habitats. Thus, salamander populations are likely to be small or nonexistent at the time maintenance is needed. The Service's December 19, 1997, biological opinion included terms and conditions for minimizing incidental take of salamanders resulting from maintenance activities. These terms and conditions are part of the Forest's proposed action and include, among others: 1) no cleaning, maintenance, or dredging of occupied tanks from January 1 to May 31 (when salamanders are most likely to be breeding and when they are most vulnerable to mortality or injury), 2) seining and holding of salamanders during maintenance activities, and then restocking the tank after the tank refills, 3) maintaining or increasing amounts of underwater objects for cover and egg deposition sites, 4) maintaining or enhancing vegetation cover at tanks, and 5) minimizing surface disturbance around tanks.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline. Federal agencies manage much of the land in the project area, particularly the Coronado National Forest, Fort Huachuca, and Coronado National Memorial. Few salamander localities are known to occur outside the allotments under consultation. Activities on private lands may require permits or funding from Federal agencies. Thus, most of the actions that are reasonably expected to occur in the project area that may adversely affect the Sonora tiger salamander would be subject to section 7 consultations. However, several occupied breeding localities are on private lands, and others are likely to occur on private lands because only the Federal lands have been surveyed extensively. These private lands are used primarily for grazing, but potentially could be subdivided and developed as ranchettes, or used for other purposes. Compliance with the Act for activities on private lands that may affect the Sonora tiger salamander, but are not addressed by section 7 consultation, could occur through section 10(a)(1)(B) of the Act.

Conclusion

After reviewing the current status of the Sonora tiger salamander, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Sonora tiger salamander. No critical habitat is designated for this species, thus none will be affected. Our conclusion of “no jeopardy” is based on the following:

1. The viability of Sonora tiger salamander populations is currently dependent upon the Forest’s livestock program, because nearly all salamander breeding populations are found in stock tanks maintained by the permittees.

2. Although range and soil conditions are degraded in most of the allotments where the salamander occurs, these degraded conditions probably affect existing salamander populations minimally and can be compensated for in part by maintenance of stock tanks.

3. Terms and conditions from the Service’s December 19, 1997, biological opinion, which are part of the proposed action, minimize the likelihood of take during maintenance of stock tanks.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to any applicant, permittee, or contractor, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant, permittee, or contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

As discussed in the effects of the proposed action, take of Sonora tiger salamander could occur as harm, harassment, injury, or death resulting from a variety of aspects of the proposed action. Take attributable to the proposed action will likely be difficult to detect and often the cause of any observed mortality will be impossible to determine (i.e., dead and dying diseased salamanders may be found, but the cause of disease transmission will likely be unknown.) However, the Service anticipates the following forms of take over the life of the project:

1) All salamanders at any tank maintained by dredging, other forms of silt removal, or other maintenance that drains the tank. However, with implementation of the terms and conditions from the Service's December 19, 1997, biological opinion, most take will be in the form of harassment resulting from capture, holding of salamanders, and re-release back into the tank.

2) Mortality or injury of up to five salamanders due to construction of range projects.

3) Mortality of up to all aquatic salamanders at one tank because of disease transmission, mortality or injury by off-road vehicles, or introduction of nonnative organisms because of easier access to tanks via road maintenance or construction.

4) Direct mortality or injury of up to two salamanders as a result of routine inspections and operations, primarily as a result of salamanders crushed on roads near occupied tank habitats.

5) Direct mortality or injury of up to all aquatic salamanders at one tank due to disease transmission by cattle or ranch hands.

6) Direct mortality or injury of up to all aquatic salamanders at one tank due to intentional or unintentional introductions of nonnative predators (bullfrogs, fish, or crayfish).

7) Loss of genetic distinctiveness at one tank due to introduction of nonnative salamanders (especially *Ambystoma tigrinum mavortium*).

8) Direct or indirect mortality or injury of up to 20 salamanders or eggs at each tank grazed by livestock as a result of cattle wading into stock tanks, removal of shoreline or aquatic cover and egg deposition sites, and increased turbidity.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If the incidental take anticipated in the preceding paragraph is met, the Forest shall immediately notify the Service in writing. If, during the action, the level of anticipated incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation. Meanwhile, the Forest must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species. The Forest must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures. This biological opinion does not authorize any form of take not incidental to implementation of the proposed action. Note that this opinion anticipates but **does not** authorize take of Sonora tiger salamanders due to illegal activities such as illegal transport and release of fish or salamanders, capture of Sonora tiger salamanders, and off-road vehicle activity.

EFFECT OF THE TAKE

The Service has determined that the level of anticipated take is not likely to jeopardize the continued existence of the Sonora tiger salamander. Although the Service anticipates the temporary loss of entire aquatic populations as a result of several aspects of the proposed action, tank populations extirpated by disease or drought are typically recolonized by terrestrial salamanders (Ziemba 1998). The likelihood of aquatic populations being eliminated is greatly reduced by the reasonable and prudent measures and terms and conditions.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of Sonora tiger salamander:

1. Continue implementation of the terms and conditions from the Service's December 19, 1997, biological opinion.

2. Distribute of information to the permittees and others who work on the allotments of the need to carry out these terms and conditions to reduce disease transmission and the likelihood of introducing nonnative organisms.

3. Define construction areas and well-defined operational procedures to minimize effects to salamanders from construction and operation of range projects and other routine activities.

4. Start measures to reduce cattle wading into tanks and reducing shoreline and aquatic cover.

5. Monitor incidental take resulting from the proposed action and report to the Service the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with the following terms and conditions in regard to the proposed action. These terms and conditions implement the reasonable and prudent measures described above. If the permittees implement these terms and conditions on the non-Federal lands within their allotments, the section 9 exemption will also apply to those non-Federal lands. Note: any range project that conforms to these terms and conditions are covered by this biological opinion.

1. The following term and condition implements reasonable and prudent measure number 1:

The Forest shall continue to implement terms and conditions of the Service's December 19, 1997, biological opinion that refers to management of allotments (1.a through 1.i).

2. The following term and condition implements reasonable and prudent measure number 2:

a. The permittees of the allotments under consultation for the salamander shall be informed of the following in a letter delivered to them within 45 days of the date of this biological opinion:

1. Take of Sonora tiger salamander is prohibited by the Endangered Species Act, but any take that occurs as a result of the grazing program is exempt from the section 9 prohibitions if grazing is carried out in a manner consistent with these terms and conditions.

2. The letter shall contain a copy of these terms and conditions.

3. The permittees are required to implement these terms and conditions on Forest lands within their allotments. If they implement these terms and conditions on non-Federal lands within their allotments, the exemption from section 9 prohibitions will also be in effect on those lands.

4. Capture, transport, and release of live salamanders or bullfrogs is prohibited by State law within the allotments.

3. The following terms and conditions implement reasonable and prudent measure number 3:

a. Within 500 m (1,650 ft) of occupied tanks, the following terms and conditions shall be carried out during surface-disturbing activities (such as construction of range projects):

1. To the extent possible, project features shall be located in previously-disturbed areas.

2. Project vehicle use shall be limited to existing routes to the extent possible.

3. Blading of work areas shall be minimized to the extent possible. Disturbance to shrubs shall be avoided if possible. If shrubs cannot be avoided during equipment operation or vehicle use, wherever possible they shall be crushed rather than excavated or bladed.

b. If a salamander is found in any project construction area, despite the distance to a tank, to the extent practicable activities shall be modified to avoid injuring or harming it.

c. No new roads shall be constructed that lead to stock tanks or pass within 90 m (300 ft) of stock tanks within the allotments under consultation.

d. If existing roads that lead to stock tanks or within 90 m (300 ft) of stock tanks on Forest lands in the allotments under consultation are graded, improved, or otherwise maintained, the tank shall be clearly posted "No Off-Road Vehicles." If the Arizona Game and Fish Department concurs, the tanks shall also be posted "No Fishing or Release of Any Aquatic Organisms". Signs shall be inspected, maintained, and replaced as needed.

e. The Forest shall use its authorities and funding sources, and seek additional funding as needed, to post as many tanks as possible in the allotments with signs that read "No Off-Road Vehicles". If the Arizona Game and Fish Department concurs, the tanks shall also be posted "No Fishing or Release of Any Aquatic Organisms". The most accessible tanks shall be the highest priority for signing.

f. Construction of any new stock tanks shall be coordinated with the Service to ensure the project would not facilitate invasion of nonnative species or disease transmission. If the Service concurs in writing that the new tank would not increase the risk of disease spread or invasion of nonnative predators or other subspecies of salamanders, no further consultation is necessary. If concurrence is not obtained, the Forest shall, following 50 CFR 402.14(a), evaluate potential effects of the action and reinitiate consultation if appropriate.

g. Existing stock tanks occupied by the salamander shall be maintained as needed to ensure their continued value as habitat for the salamander. Maintenance of tanks in the allotments that contain nonnative organisms (fish, bullfrogs, crayfish, or other subspecies of salamander) shall be coordinated with the Service and carried out in a way, if possible, to eliminate nonnatives.

h. The permittees or others authorized to work at stock tanks shall take all practicable precautions to minimize disease transmission and translocation of aquatic organisms. Any equipment (such as waders, shovels, fence posts, etc.) used at a tank within the allotments shall be allowed to thoroughly dry or shall be rinsed in a 10 percent bleach solution before using the same equipment at another tank. No water shall be pumped from tanks occupied by the Sonora tiger salamander. All precautions shall be taken (such as fish screens and adding bleach) to ensure that fish, bullfrogs and their tadpoles, and crayfish are not moved among tanks as a result of pumping water from a contaminated source and trucking it to a trough or tank.

4. The following terms and conditions implement reasonable and prudent measure number 4:

a. The Forest shall use its authorities and funding sources, and seek additional funding, to fence as many occupied tanks or portions of tanks as possible and feasible to increase shoreline and aquatic cover and reduce potential mortality and injury to salamanders due to cattle wading into tanks or spreading disease to populations. If tanks are fenced completely, cattle could be watered by providing water lines from the tanks to troughs or drinkers. Double tanks, where one tank is fenced, and the other is not, could also be employed.

b. The Forest shall use its authorities and funding sources, and seek additional funding, to begin enhancement of aquatic cover and egg deposition sites in tanks grazed by cattle. Enhancement could take the form of placing logs, branches, or dead trees and shrubs into the tanks.

5. The following terms and conditions implement reasonable and prudent measure number 5:

The Forest shall monitor take of Sonora tiger salamanders and document any disturbance of salamanders or salamander habitat. The results of this monitoring shall be reported in the annual report described in the general terms and conditions of this biological opinion. Other monitoring and reporting requirements for the Sonora tiger salamander are described in the general terms and conditions.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the Sonora tiger salamander. In furtherance of the purposes of the Act, we recommend the following discretionary actions:

1. The Forest could help fund studies of vectors of disease transmission, salamander metapopulation dynamics, distribution of the *mavortium* genome in the San Rafael Valley, the movements and habitat use of terrestrial salamanders, and other topics that may improve our understanding of the conservation and recovery needs of the Sonora tiger salamander.

2. The Forest could continue to actively participate in the preparation of the Sonora tiger salamander recovery plan and assist in its implementation.

3. The salamander recovery plan, scheduled for completion in February 2000, is expected to contain specific recommendations for stock tank operation and maintenance, cattle use at tanks, maintenance and enhancement of cover and egg deposition sites, and other topics related to grazing effects. After completion of the recovery plan, the Forest and the Service could reevaluate the terms and conditions herein and make changes as needed to be consistent with the plan.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

(Note: surveys for Sonora tiger salamander that involve capture or take require appropriate permits from the Service and Arizona Game and Fish Department.)

CONCLUSION

DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon locating a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (602/261-6443) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

GENERAL TERM AND CONDITION

To implement the reporting requirements identified in the preceding terms and conditions and to address all species covered by this consultation, the Coronado National Forest shall submit an annual report to the Arizona Ecological Services Field Office. The report shall, at a minimum, briefly summarize for the previous calendar year the implementation:

1) the implementation of terms and conditions and conservation recommendations;

2) estimates of and documentation of any incidental take;

3) any excess use, increased animal months, unauthorized use, or other detrimental variations from the proposed action; and

4) a discussion of the effectiveness of the terms and conditions and their effects on the Forest's grazing program.

The annual report is due March 15 of each year with the first report due March 15, 2000.

CLOSING STATEMENT

This concludes formal consultation on the Coronado National Forest's proposed livestock grazing program, southeastern, Arizona. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation, if it is determined that the impact of such taking will cause an irreversible and adverse impact to the species. Any questions or comments should be directed to Doug Duncan (520/670-4860) or Tom Gatz (602/640-2720 x240) of the Arizona Ecological Services Field Office.

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APPENDIX - CONCURRENCES

This section contains all concurrences and conditional concurrences with “may affect, not likely to adversely affect determinations”. The status of the species and much of the environmental baseline for the species in the formal section of the BO is discussed in the formal section of this biological opinion. Any relevant parts of those sections are incorporated here by reference.

BLACK-FOOTED FERRET (*Mustela nigripes*)

Environmental Baseline

Status of the Species in the Project Area

In Arizona, the black-footed ferret occurred in association with Gunnison's prairie dog colonies, from western Coconino County eastward, north of the Mogollon Rim (Hoffmeister 1986). Four specimen records for the State are recorded in theAGFD HDMS. These specimens date from the early part of this century. Ferrets have been reintroduced to the Aubrey Valley as an experimental-nonessential population. There are no records of ferrets in southern Arizona, southwestern New Mexico, or Mexico. Because black-footed ferrets are so difficult to find and are so dependent on prairie dogs, they probably occurred where prairie dogs occurred in southeastern Arizona. Black-tailed prairie dogs occurred historically in southeastern Arizona, but no longer occur (Hoffmeister 1986). No records are known to exist for the Forest. Potential habitat does occur and a prairie dog town exists in Mexico, about 20 to 40 km (13-25 miles) from the Forest. Only the Huachuca EMA was considered for the effects of the action to black-footed ferret.

Effects of The Action

Most effects of livestock grazing on black-footed ferret would be indirect effects to prairie dogs. The only way for direct effects to occur, would be from livestock collapsing burrows occupied by ferrets. The chance of this occurring on the Forest is nonexistent now. Livestock grazing effects to prairie dogs would also be mostly indirect. There is research which indicates that livestock grazing may be beneficial for prairie dogs (Koford 1958, Smith 1958, Hyngstrom and Foster 1990). However, prairie dogs have been the focus of extensive control actions because people perceive their burrows are a hazard to humans and livestock, they may be disease vectors, and they may compete with livestock for forage (Hubbard and Schmitt 1984). Widespread reduction in prairie dog towns is probably a major factor in the rarity of the black-footed ferret. Prairie dogs have been so persecuted and reduced in range and numbers, that a petition to list the black-tailed prairie dog was recently received by the Service. Control of prairie dogs is not a part of the proposed action, no prairie dogs presently occur on the Forest, and there are no active plans to reintroduce either prairie dogs or ferrets to the Forest.

Conclusion

The Service concurs with the Forest's determination that the proposed action may affect, but is not likely to adversely affect the Black-footed ferret based on the above discussion.

JAGUAR (*Panthera onca arizonensis*)

Environmental Baseline

Status of the Species in the Project Area

Brown (1983) presented an analysis suggesting there was a resident breeding population of jaguars in the southwestern United States at least into the 20th century. The Service (USFWS 1990a) recognizes that the jaguar continues to occur in the American Southwest, at least as an occasional wanderer from Mexico. Goldman (1932) believed the jaguar was a regular, but not abundant, resident in southeastern Arizona. Hoffmeister (1986) considered the jaguar an uncommon resident species in Arizona. He concluded that the reports of jaguars between 1885 and 1965 indicated that a small but resident population once occurred in southeastern Arizona. Brown (1983) suggested that the jaguar in Arizona ranged widely throughout a variety of habitats from Sonoran desertscrub upward through subalpine conifer forest. Most of the records were from Madrean evergreen-woodland, shrub-invaded semidesert grassland, and along rivers.

The most recent records of a jaguar in the United States are from the New Mexico and Arizona border area and in southcentral Arizona, both in 1996, and confirmed through photographs. In 1971, a jaguar was taken east of Nogales, Arizona, and, in 1986, one was taken from the Dos Cabezas Mountains in Arizona. The latter individual reportedly had been in the area for about a year before it was killed (Ron Nowak, USFWS, pers. comm., 1992 *in litt.* USFWS 1997c).

The AGFD (1998) cited two recent reports of jaguars in Arizona. The individuals were considered to be transients from Mexico. One of the reports was from 1987 from an undisclosed location. The other report was from 1988, when tracks were observed for several days prior to the treeing of a jaguar by hounds in the Altar Valley, Pima County. An unconfirmed report of a jaguar at the Coronado National Memorial was made in 1991 (Ed Lopez, Coronado National Memorial, pers. comm., 1992 *in litt.* USFWS 1997c). In 1993, an unconfirmed sighting of a jaguar was reported for BANWR (William Kuvlesky, pers. comm., *in litt.,* USFWS 1997c).

Barber (1902) speculated that jaguars made their way into the Mogollon Mountains of New Mexico by ascending the Gila River. Bailey (1931) suggested that jaguars seemed to be native in southern New Mexico but were regarded as wanderers from across the United States-Mexico border. He listed nine reports of jaguars in New Mexico from 1855 to 1905. Brown (1983) stated that the last record from New Mexico was from 1905. Nowak (1975) mentioned reports of jaguars along the Rio Grande from as late as 1922. Halloran (1946) reported that dogs "jumped" a jaguar in the San Andres Mountains in 1937. Findley et al. (1975) stated that jaguars once occurred as far north as northern New Mexico.

Brown (1991) did not believe the jaguar was extirpated from northern Mexico. Although jaguars were considered relatively common in Sonora in the 1930's and 1940's, he cited a population about 800 miles south of the United States-Mexico border as the most northern officially reported. However, Brown suggested that there may be more jaguars in Sonora than are officially reported. He mentioned reports of two jaguars which were killed in central Sonora around 1970. He also discussed assertions by the local Indians that both male and female jaguars still occurred in the Sierra Bacatete about 200 miles south of Arizona. Brown speculated that if a reproducing population of jaguars is still present in these mountains, it may be the source of individuals which travel northward through the Sierra Libre and Sierra Madera until they reach Arizona. Nowak (*in litt.*, USFWS 1997c) reiterated that as late as 1987, the species was still considered common in the Sierra Bacatete near Guaymas, Sonora. Brown (1989) reported that biologists from Mexico have stated that at least two jaguars have been killed in Chihuahua. In Arizona, jaguar prey populations have increased, and large tracts of brush and canyon woodland are still available to provide cover for jaguars.

There are 53 allotments on the Forest with watershed condition information (USFS 1998c:D-13-15). Of these allotments, 25 have unsatisfactory watershed condition and 15 have unsatisfactory riparian condition compared to Forest Plan standards and guidelines. All 15 allotments with unsatisfactory riparian condition also have unsatisfactory watershed condition. Watershed condition is determined by soil condition, riparian condition, and water quality. One of the criteria required to reach a not likely to adversely affect determination for jaguar, is “Normal livestock activities within riparian areas does not reduce cover” (USFS 1998a:22, 1998b:21). This criterion reflects the importance of riparian areas to the jaguar and its prey. If the riparian condition is unsatisfactory, a corresponding reduction in riparian cover is likely.

However, the BA presents no information to determine the cause of unsatisfactory riparian conditions. Because of the likely use of riparian areas by livestock, grazing is the most probable cause. The Santa Rita and Tumacacori EMA’s have 13 allotments where the proposed action was determined to be not likely to adversely affect and the riparian condition is unsatisfactory. All 13 allotments are covered by the long-term guidance criteria (USFS 1998b). The longer time frame of the proposed action increases the chance that impacts to the jaguar could occur.

Effects of The Action

The basic effects of the proposed action would be through habitat modification or from predator control activities. Predator control is not a part of the proposed action, and any predator control undertaken on the Forest would probably be subject to section 7 consultation under the ESA.

It is well known that livestock grazing can alter vegetation (Marlow and Pogacnik 1985, Ohmart and Anderson 1986, Stromberg 1993a, Fleischner 1994). Changes in vegetation type or structure could affect cover for jaguars. In addition, changes in vegetation may modify the population dynamics of jaguar prey species such as deer and javelina. Livestock grazing in southeastern Arizona and Nevada has been shown to affect deer cover and movement (Loft et al. 1987, Loft et al. 1991, Ockenfels et al. 1991, Ragotzkie and Bailey 1991). Jaguars (Nowak 1975, Swank and

Teer 1989) and their prey (Krausman et al. 1985, Hoffmeister 1986, Ohmart and Anderson 1986, Loft et al. 1987) rely heavily on riparian areas. Therefore, impacts to riparian vegetation may impact jaguars indirectly by reducing cover for them and also for their prey.

Conclusion

The Service concurs with the Forest's determination that the proposed action may affect, but is not likely to adversely affect the jaguar based on the above discussion and the guidance criteria (USFS 1998a, 1998b). However, the concurrence for 13 allotments has a condition. They are:

Alto	Marstellar	Ramanote
Box Canyon	Murphy	Rock Corral
Helvetia	Pena Blanca	Rosemont
Mariposa	Proctor	Sopori
		Stone Springs

1. The Forest will resurvey the 13 allotments to determine the present riparian condition. If the riparian condition by allotment is still unsatisfactory, the Forest should determine the cause of the condition. If livestock grazing is the cause, the Forest should, before December 31, 1999, either:

    A. Reduce grazing in the unsatisfactory riparian areas through either deferment, rest, enclosure, riparian pastures with reduced utilization standards, or a reduction in utilization for the pastures containing those unsatisfactory riparian areas; or

    B. Initiate formal consultation for those allotments for the effects of livestock grazing to the jaguar.

LESSER LONG-NOSED BAT

Below are the Service concurrences and rationale with Forest determinations of "may affect, not likely to adversely affect" the lesser long-nosed bat for allotments, grouped by EMA.

<u>Chiricahua EMA</u>
Oak and **Rough Mountain** allotments: The majority of the vegetation community in both allotments is oak woodland and chaparral. Though livestock are present in the allotments for the first two weeks of the agave bolting season (until April 30) the allotment is less than half capable range and these are less important areas for paniculate agaves. Utilization levels are 45 percent.

<u>Galiuro EMA</u>
Bass allotment: Two weeks bolting season use occurs with 50 percent utilization. There is 29 percent capable range, composed primarily of desertscrub and oak woodland vegetation types. Approximately 70 percent of the total area in this allotment would receive light to no grazing.

Bayless allotment: There is year-long grazing with 25 percent utilization. Capable range is 6 percent, composed primarily of desertscrub and oak woodland vegetation types. Approximately 95 percent of the total area in this allotment would receive light to no grazing.

Fourmile allotment: There is year-long grazing with 45 percent utilization. It has 14 percent capable range, composed primarily of desertscrub and oak woodland vegetation types. Approximately 85 percent of the total area in this allotment would receive light to no grazing.

San Pedro allotment: There is year-long grazing with 40 percent utilization. Capable range is 9 percent, composed primarily of desertscrub and oak woodland vegetation types. Approximately 90 percent of the total area in this allotment would receive light to no grazing.

Huachuca EMA
Bender and **Miller Canyon** allotments: Both allotments have no bolting season use and 45 percent utilization.

Blacktail, **Campini**, and **HQ** allotments: These allotments have 45 percent utilization and are largely composed of plains grassland, a vegetation type that does not support many agaves.

Santa Catalina EMA
Barney allotment: This allotment has year-long grazing with 35 percent utilization limits. There is 27 percent capable range which is primarily oak woodland. Approximately 65 percent of the total area in this allotment would receive light to no grazing.

Canada Del Oro and **Rock Pile** allotments: Both allotments have no agave bolting season use and utilization levels are 45 percent.

Last Chance allotment: This is a year-long allotment with 45 percent utilization. Capable range is 47 percent and is composed primarily of desertscrub, where there are fewer agaves.

Santa Rita EMA
Rosemont and **Stone Springs** allotment: Both allotments are not used during the agave bolting and both have 45 percent utilization.

Santa Teresa EMA
Foster allotment: Livestock use occurs for two weeks during the agave bolting season with 50 percent utilization rate. It is only 19 percent capable range. Approximately 80 percent of the total area in this allotment would receive light to no grazing.

Kane Springs allotment: There is no use during the agave bolting season. Utilization is 50 percent, though only 17 percent of the allotment is included as capable range. Approximately 80 percent of the total area in this allotment would receive light to no grazing.

South Goodwin allotment: There is year-long grazing and 35 percent utilization. Only 13 percent of the allotment is capable range. Approximately 85 to 90 percent of the total area in this allotment would receive light to no grazing.

Whetstone EMA
Coalmine allotment: No bolting season use with a 45 percent utilization rate.

Mescal allotment: Agave bolting season use occurs for two weeks with grazing utilization levels set at 45 percent. The majority of the vegetation in capable range is desertscrub; the allotment is only 40 percent capable range..
Middle Canyon allotment: There is year-long grazing with 45 percent utilization. Only 36 percent of the range is classified as capable, and the majority of vegetation is desertscrub (less important areas for Palmer's agave).

Winchester EMA
Polecat allotment: This is year-long grazing with 40 percent utilization. Most of the allotment is pinyon-juniper which generally has low densities of agaves. Capable range is 39 percent.
Rocky allotment: This is a year-long grazing allotment. Utilization limits are set at 30 percent. Capable range is 55 percent, being comprised mostly of oak woodland. The Forest reports this allotment has relatively few agaves.

Conclusion

Based on information presented in the BA, the two sets of grazing guidance criteria applied to the grazing allotments on the Forest (USFS 1998a, b, c,), the Service concurs with the Forest Service finding of "may affect, not likely to adversely affect" for the lesser long-nosed bat.

AMERICAN PEREGRINE FALCON

The status of the species and much of the environmental baseline for the American peregrine falcon is discussed in the formal section of this biological opinion. Any relevant parts of those sections are incorporated here by reference.

Environmental Baseline

Effects of The Action

The 12 EMA's encompass the major mountain ranges of southeastern Arizona. Allotments (by name, EMA, and effect determination) are on pages III-3 and III-4 of the BA were determined by the Forest Service to be a "may affect, is not likely to adversely affect" for American peregrine falcon according to the February 13, 1998, guidance criteria. Maps showing known eyries and allotments in the mountain ranges are on pages III-12 to III-22 of the BA (USFS 1998c).

The intent of the February 13, guidance criteria (USFS 1998a) is to identify allotments with short-term impacts (primarily disturbance to nesting pairs) during the next three years. The criteria states that if occupied, historic, or potential peregrine falcon nesting habitat occurs in an allotment or within 3.3 km (2.1 mi) of the allotment boundary, routine grazing activities may affect the falcon. If all construction activities are excluded within 800 m (0.5 mi) of a nesting cliff during breeding season (March 1 to July 15, annually), and routine grazing does occur, the finding is “may affect, is not likely to adversely affect” for the falcon. Sixty-seven allotments are listed as “may affect, is not likely to adversely affect” for peregrine falcon with these criteria.

Annual operating instructions for allotments with nesting habitat will be modified to include breeding season restrictions for construction activities. All construction activities must be excluded within 800 m (0.5 mi) of a nesting cliff during the peregrine falcon’s breeding season (March 1 to July 15, annually).

The August 25 (USFS 199bb) long-term grazing criteria is applied to term allotments (up to 10 years). The intent of the criteria is to identify allotments with potential for disturbance to known peregrine falcon nesting pairs, and allotments that contain degraded watersheds and riparian areas that negatively impact the birds that are prey for the peregrine falcon. The criteria indicate “may affect, is not likely to adversely affect” for peregrine falcon if the following are met:

1. The watershed (including riparian areas) within the allotment is in less than satisfactory condition but livestock presence will not hinder improvement, and

2. Routine grazing operations occur, but all construction activities are excluded within 800 m (0.5 mi) of nesting cliffs during the breeding season (March 1 to July 15, annually)(USFS 1998b).

Appendix D in the BA lists watershed and riparian conditions for the 55 allotments reviewed under the August 25, 1998, criteria. The basis for evaluating watershed and riparian conditions is also described in Appendix D (USFS 1998c).

Conclusion

Based on information presented in the BA, the two sets of grazing guidance criteria applied to the grazing allotments on the Forest (USFS 1998a, 1998b, 1998c), and limited information available for this species on the Forest (surveys of potential nesting habitat, surveys of all known nests regularly, grazing effects, prey species, and reproductivity), the Service concurs with the Forest finding of “may affect, not likely to adversely affect” for peregrine falcon. Annual data on peregrine use of the Forest will be useful in future consultations and in recovery efforts.

APLOMADO FALCON *(Falco femoralis septentrionalis)*

Environmental Baseline

While aplomado falcon are not known to occur on the Coronado National Forest, all twelve EMA's were evaluated for grazing effects to the species under current livestock activities. Seven EMA's were determined to contain potential aplomado falcon habitat (USFS 1998c:III-24-27). Wintering aplomado falcons have been observed recently at the Gray Ranch, Animas Valley, New Mexico, which is next to grazed lands of the Coronado, but recent (since 1993) winter raptor surveys conducted in potential habitats (grasslands with scattered yucca and tree savannas) did not find aplomado falcons (USFS 1998c:III-26).

According to the Aplomado Falcon Recovery Plan (USFWS 1990b), habitat alteration was the primary reason the aplomado falcon was extirpated from Arizona. High levels of livestock grazing in the 1880's, with losses of riparian and grassland habitats, changed the falcon's preferred habitats of open grasslands (foraging) with scattered yuccas and mesquites (nesting) into desert-scrub with greater densities of mesquite, catclaw, and other woody species. Water diversion, channelization, groundwater pumping, urban and agricultural demands, and the resulting hydrological change in both upland and riparian ecosystems further threatens and degrades the species' potential habitat. Introduced exotic grass planted on a landscape basis over the last 30 years has increased monotypic ground cover characteristics. Not well studied, this monotypic regime may have altered the aplomado falcon's prey species diversity, abundance, and distribution.

Grazing guidelines in the Forest Plan could be expected to improve grassland conditions for the aplomado falcon, because grazing, if carefully managed, could be used to "promote habitat heterogeneity and prey species diversity and abundance." (USFWS 1990b). The Plan goes on to note approximately 80 percent of the herbaceous ground cover should not be taller than 50 cm (19 in) in height. Light grazing and burning may help improve prey species diversity and abundance in potential habitat for the falcon. Standards and guidelines for soil and water emphasize protection of riparian-dependent resources (e.g., soil, water, vegetation, wildlife and fish). Aplomado falcons use riparian areas for foraging, and these areas generally contain the highest diversity of known prey species (small birds, winged insects, rodents, and reptiles).

There are two sets of guidance criteria for determining the effects of grazing activities for species; one (USFS 1998a) is applied to allotments with on-going grazing; the other (USFS 1998b) is applied to allotments with long-term grazing. The criteria for effects to aplomado falcon did not change between the two sets; the Forest Service has determined grazing "may affect, is not likely to adversely affect" the aplomado falcon on certain allotments.

Effects of the Action

Light grazing is a subjective term; the BA notes variable utilization rates from 35 percent to 45 percent during the growing season, some at 45 percent in dormant season, to some set at 50 percent maximum use. It is difficult to tell how grazing will affect the species. The grazing criteria noted the following would call for a "may affect, is not likely to adversely affect" finding if:

1. Livestock grazing occurs within occupied, suitable unsurveyed, or potential unsurveyed aplomado falcon habitat only in concert with a monitoring program to determine responses of the habitat and the falcon to grazing, and

2. Areas of savanna with yucca and scattered trees are being maintained for prey production and nesting habitat.

Without aplomado falcons to monitor, their responses to grazing cannot be determined (on the Forest). A similar monitoring study (per #1, above) was required in the Mimbres Resource Management Plan biological opinion (May 1, 1997) for BLM livestock grazing activities. The study occurs in New Mexico and studies five years of grazing and their effects to the falcon and its habitat. After study results are made available, the Forest will evaluate and incorporate grazing program changes where appropriate to meet the needs of aplomado falcon.

Conclusion

Based on information in the BA, recent raptor surveys on- and off-Forest, the anticipation of improved status of upland grazing conditions as part of the Forest Plan, and the proposed reevaluation and application of study information from BLM, the Service concurs with the Forest effects determination of "may affect, is not likely to adversely affect' for aplomado falcon. Studies regarding habitat and prey species diversity and abundance, with information on nesting and foraging needs of the aplomado falcon would enhance the Forest's efforts toward recovery of the species in Arizona.

BALD EAGLE (*Haliaeetus leucocephalus)*

Environmental Baseline

Status of the species in the Project Area

The Coronado National Forest periodically holds wintering and migrating bald eagles, but not nesting eagles. There are no known records of bald eagles nesting on the Forest. Wintering bald eagles have been seen on or near the Forest at West Turkey Creek, Pinery Canyon, Sulphur Springs Valley, Rucker Lake, Parker Canyon Lake, and Riggs Lake. Other potential wintering areas include Arivaca Lake, Bog Hole, Whitewater Draw, Patagonia Lake, Pena Blanca Lake, and Willcox Playa. The AGFD has monitored potential wintering sites. Riggs Lake is not part of an allotment and is not grazed by livestock.

Effects of the Action

Grazing can affect bald eagles directly and indirectly. Livestock can disturb roosting and nesting sites. Livestock presence does not seem to concern eagles. Livestock gathering around nests has elicited reactions from bald eagles. There are no known nests on the Forest.

Indirect effects of livestock are those that may affect riparian vegetation, or the functioning of aquatic systems and their watersheds. Livestock can affect riparian trees that eagle may use as roosting or nesting sites. Livestock grazing in riparian zones and in the watershed can affect specific components of them and degrade the whole system. These effects are discussed in greater detail in other sections of this BO (e.g., Gila topminnow).

Some research suggests that grazing activities seldom influence wintering bald eagles (Steenhof 1978). The main concern for wintering eagles and grazing on the Forest is the maintenance of roost trees. The best sites and trees may be the only ones used, and tend to have large trees surrounding the roost trees that may serve as some sort of buffer (Platt 1977, Martell 1992). Where eagles roost on the Coronado is unknown. Roosts could be in upland or riparian habitat. The action as proposed should not reduce roost trees in upland areas.

Since riparian areas in the west part of the Chiricahua EMA are in satisfactory condition (USFS 1998c:III-30), potential roost trees should be present and should be maintained throughout the proposed action. According to 1998 range inspection reports for the Galiuro's, recruitment of riparian trees is occurring (USFS 1998c:III-31). High Creek allotment in the Galiuro EMA has satisfactory riparian conditions. The BA also states for all other allotments with not likely to adversely affect determinations for the bald eagle. Soil, riparian, and watershed condition are all unsatisfactory for the Pena Blanca allotment near Pena Blanca Lake. However, the BA states that livestock grazing in riparian areas is not reducing roost trees (USFS 1998c:III-33).

Conclusion

The Service concurs with the Forest's determination that the proposed action may affect, but is not likely to adversely affect the bald eagle. This concurrence is based on the following:

1. There are no known nesting or roost sites, therefore no disturbance of such sites is occurring; and

2. Grazing in riparian areas is not reducing long-term nest and roost tree regeneration (USFS 1998c).

CACTUS FERRUGINOUS PYGMY-OWL

The Service does not concur with the "may affect, not likely to adversely affect" determination made for 11 allotments for the pygmy-owl. These 11 allotments were formally consulted on.

MASKED BOBWHITE QUAIL (*Colinus virginianus ridgwayi*)

Environmental Baseline

In the Tumacacori EMA occur three allotments considered for analysis of livestock grazing activities by the Forest Service on masked bobwhite quail. These allotments are the only areas considered to contain historic habitat for the species. Located on the Nogales Ranger District, surveys for masked bobwhite have not been conducted in recent years. Recent information from the Buenos Aires NWR indicates the presence of masked bobwhite within 800 m (0.5 mi) of the Forest boundary next to the refuge. Per Shifflet (1987), medium potential or not suitable habitat occurs on the Forest, and suitable, high potential habitat does not occur. Impacts to masked bobwhite associated with grazing activities primarily results from habitat modification and lack of grass and forb species diversity. Heavy grazing reduces herbaceous vegetation, plant species abundance, shrub structure and cover, aids invasion by woody plants and exotic species, causes soil loss on vulnerable soils, and contributes to fire influence in desert grasslands.

Guidance criteria for grazing activities have not been established for masked bobwhite. Current understanding is the species can exist only under light to no grazing. Light grazing has not been defined regarding utilization or any other parameters and appears highly subjective. Reproductive success (as shown on the refuge) depends on factors other than no grazing. Appropriate grazing levels are difficult to quantify. Current vegetation use is set at 35 percent during the growing season on the three historic quail habitat-containing allotments. Surveys for quail presence and continued monitoring will provide information for appropriate management decisions in areas with potential habitat for this species.

Conclusion

The Service concurs with the Forest Service's effects determination of "may affect, not likely to adversely affect" for masked bobwhite quail due to the following:

1. current information indicates allowable use levels will result in sufficient amounts of herbaceous material being retained for quail use, and

2. current grazing management should allow the allotments to reach suitable watershed conditions in the future, although allotment watershed conditions are currently unsuitable.

MEXICAN SPOTTED OWL

The status of the species and much of the environmental baseline for the Mexican spotted owl was discussed in the formal section of this biological opinion. Any relevant parts of those sections are incorporated here by reference. The Service did not concur with the not likely to adversely affect determinations for two allotments. They are covered in the formal section.

Environmental Baseline

The areas of known perennial water in two PAC's in the Chiricahua EMA are inaccessible to livestock (Gary Helbing, Douglas Ranger District, pers. comm., March 22, 1999). The allotments that contain the 14 Chiricahua PAC's have range condition that are mostly moderately low upward or high-static (except RAK). The 27 allotments of the EMA have satisfactory watershed and riparian condition. All allotments are grazed either seasonally or under deferred rotation or rest rotation systems. Utilization standards are 45 to 50 percent.

The 12 allotments in the Peloncillo EMA have not likely to adversely affect determinations because there is grazing in suitable habitat. However, there are no PAC's and only a few sightings of spotted owls. There are also no PAC's on the South Goodwin allotment in the Santa Teresa EMA.

All the Santa Rita EMA PAC's are in non-capable acreage that is generally inaccessible to livestock. Little cattle sign has been noted within the 15 PAC's. Several known perennial water sources occur in several PAC's. All these are near the top of Mount Wrightson in an area unallotted.

Several PAC's in the Huachuca EMA are known to have perennial water and riparian vegetation. One is in the Lone Mountain allotment analyzed in the formal section of the BO. The other PAC is in the Carr Canyon allotment. A no effect determination was made for Carr Canyon allotment since no grazing is proposed. The one PAC in the Whetstone EMA was considered in the BO.

In the Galiuro EMA there are five spotted owl PAC's that are almost all outside capable range areas. The BA (USFS 1998c:III-59) states grazing may occur in owl habitat in the Deer Creek, High Creek, Bass Canyon, and Bull Tank allotments. Only Deer Creek and High Creek allotments have PAC's.

The Santa Catalina EMA has several PAC's with known perennial water (*in litt.* March 12, 1999). The Canada del Oro Allotment contains three PAC's (0505012, 0505014, 0505008) that include perennial water. The November Biological Assessment indicates that grazing occurs between October 1 and March 31. Utilization is set at a maximum of 45 percent. Range condition and trend data indicate that 35 percent of the allotment is in moderately low (fair) condition and 65 percent is moderately or good. The allotment contains 467 ha (1,154 acres) of deciduous riparian vegetation. Domestic livestock do not graze the riparian areas in PAC's in the Canada del Oro allotment and are in an area considered noncapable (USFS 1999). The other PAC's with known perennial water are in an area closed to grazing.

Three of the five PAC's in the Tumacacori EMA are in allotments that are a part of the proposed action. The three PAC's have no known perennial water (*in litt.*, March 12, 1999). Ramanote and Marstellar allotments have allowable vegetation utilization set at 35 percent for the summer and 45 percent for the winter. The utilization for the Pena Blanca allotment is 45 percent. The drainages within PAC's may be accessible to livestock. Watershed and riparian condition on these allotments is unsatisfactory. Range condition is mostly moderately-high on all three allotments. These allotments are a concern for their potential impacts to spotted owls because livestock may have access to PAC's, utilization may be higher than called for in the recovery plan (USFWS 1995a), and livestock have access to riparian areas in the allotments.

Some of the 31 PAC's of the Pinaleno EMA contain perennial water (*in litt.*, March 12, 1999) and mountain meadows. Almost all these areas are unallotted to grazing or inaccessible to livestock. A PAC with perennial water in Grant Creek allotment has been grazed in the past. Measured vegetation utilization in the riparian zone was less than 10 percent (Genice Froelich, Safford Ranger District, pers. comm., March 29, 1999).

The one Winchester EMA PAC may be grazed by livestock in a small area. This area contains no known perennial water.

Effects of the Action

Most determinations made by the Forest of no affect and not likely to adversely affect the MSO were based on many PAC's being inaccessible because of topography, vegetation, or the grazing system. Additional decision points were that grazing does not limit cover for prey species and allows fire management to reduce the risk of catastrophic wildfires. However, the information presented does not clearly show isolation of all PAC's from livestock. Also, vegetation utilization within PAC's is unknown as is the riparian condition within them. The Service is concerned that livestock grazing, not only in riparian areas inside PAC's, but also in uplands in PAC's, restricted habitat, and riparian areas outside PAC's, may be inhibiting the recovery of the MSO.

Protected Activity Centers within the following allotments are known to contain or be near mountain meadows or riparian vegetation: Paradise, Lone Mountain, Carr Canyon, Mescal, Marijilda, Bonita, White Streaks, Hawk Hollow, O Bar O, Grant Creek, Canada del Oro, Bellota, Redington Pass, and Happy Valley. This is based on very little information that is available to the Service. There are almost certainly other PAC's that contain riparian vegetation that provides cover for important owl prey species.

Conclusion

The Service concurs with the Forest's determination that the proposed action "may affect, but is not likely to adversely" affect the Mexican spotted owl for all allotments so determined in the BA, except two considered in the formal consultation. This concurrence is conditioned upon the following:

1. Riparian areas within PAC's need to be identified. Priority is to identify riparian zones that are, or may be, accessible to livestock. This information is needed to help the Forest and the Service in determining the effects that future action could have on these riparian areas, and the potential effects to Mexican spotted owls. The Forest will provide the Service a map and a list of riparian areas in PAC's before January 1, 2000.

2. Riparian areas within PAC's should be either:

    A. Excluded from livestock through fencing if the area may be accessible to livestock or the Forest should demonstrate how the area is inaccessible to livestock; or

B. Have key areas established in them, with vegetation utilization being limited to the allowable use guide in the amended Forest Plan until site-specific data show higher levels meet the intent of the recovery plan.

Either of these conditions should be met within one year after the date of this biological opinion.

3. The Forest should start the recommendations of the MSO recovery plan and the intent of the Allowable Use Guide (ROD) wherever suitable or potential MSO habitat occurs.

SOUTHWESTERN WILLOW FLYCATCHER (*Empidonax traillii extimus)*

Environmental Baseline

Status of the Species

Historic or current records of southwestern willow flycatcher do not exist for the Coronado National Forest. The BA states the closest known breeding population for this species is at Cook's Lake (near the San Pedro River). Southwestern willow flycatchers have been detected during migration periods near the Santa Cruz River at the Peck Canyon and Interstate 19 highway interchange, near Cottonwood Spring next to Sonoita, on the San Pedro Riparian National Conservation Area on the San Pedro River, and on Cienega Creek on the Empire-Cienega Resource Conservation Area (BLM) north of Sonoita. Known flycatcher populations exist downstream of the Forest on the lower San Pedro River.

The Forest has conducted some surveys from 1996 to 1999. Surveys using AGFD-approved methods were completed at Paige and Ash Creeks (Rincon Mountains); Canada del Oro, Peppersauce, Sabino Creek, and Alder Canyon (Santa Catalina Mountains); Redrock and Parker Canyons (Patagonia Mountains); Cave Creek (Chiricahua Mountains); and Soldier and Grant Creeks (Pinaleno Mountains). Neither southwestern willow flycatcher nor suitable habitat has been found on the Forest. Areas on the Forest with potential habitat tend to produce unpredictable water flows, are canyon-bound, possess vegetation currently not suitable, and vegetation with potential may not become suitable habitat even if it were to grow to maturity. These factors may restrict or preclude use of these areas by southwestern willow flycatcher.

Paige Creek is the only drainage on the Forest that may have limited potential to develop suitable habitat for this species; it is currently not suitable habitat. Paige Creek lies within the Happy Valley allotment and the BA notes most of the allotment is in moderately-high or high range condition. Some of Paige Creek's riparian area is excluded from livestock grazing. Riparian thickets of approximately 0.4 to 0.8 ha (1-2 ac) are developing. Cottonwood comprises the majority species and a willow component is developing.

Effects of The Action

Livestock grazing can cause degradation of all riparian habitat components. These effects are described in the Effects of the Action and in the Gila topminnow section of this document. Livestock overgrazing is a leading cause of deterioration and loss of southwestern willow flycatcher habitat (USFWS 1993b, Tibbitts et al. 1994). Because more than half of Paige Creek's riparian areas are excluded from livestock grazing, these areas are assumed to possess the ability to develop into mature vegetation, and this vegetation may or may not become suitable habitat for southwestern willow flycatcher. Livestock use of riparian areas not presently excluded is a concern to the Service.

Other effects from livestock grazing may include disturbance or other livestock-associated activities. Brown-headed cowbirds are attracted to livestock and their associated facilities (corrals, barns, stockyards, bare ground). Cowbirds negatively impact the flycatcher's breeding and reproductive success and are one reason this species was listed. Currently, the southwestern willow flycatcher does not occur on the Happy Valley allotment. Should this flycatcher begin to use Paige Creek, the presence of cowbirds will become an important concern. Positive factors of the Happy Valley allotment are its moderately-high to high range condition and livestock grazing-excluded riparian areas.

Conclusion

Based on the above discussion and the guidance criteria (USFS 1998a, 1998b), the Service concurs with the Forest's determination that the proposed action on Happy Valley allotment "may affect, but is not likely to adversely affect" the southwestern willow flycatcher.

CHIRICAHUA DOCK (*Rumex orthoneurus*)

Conclusion

Chiricahua dock was proposed for listing as threatened in 1998 (USFWS 1998b). Since that date, many new populations have been found and some existing populations are not threatened to the same degree as when this species was proposed for listing. Livestock grazing can impact Chiricahua dock. This species is very palatable to livestock and easily trampled. The Forest should continue species protection using their current conservation actions. Many Forest Chiricahua dock populations occur in locations similar to many Forest's MSO PAC's; they are near mountain top areas and are mostly inaccessible to livestock. Because this species is more widespread and less threatened than initially believed, and is afforded some protection on the Forest, the Service concurs with the Forest's effect determination that the proposed action "is not likely to jeopardize" Chiricahua dock.

HUACHUCA WATER UMBEL

The Service does not concur with the "may affect, not likely to adversely affect" determination made for the Papago allotment for the umbel. This allotment was formally consulted on.

PIMA PINEAPPLE CACTUS (*Coryphantha scheeri* var. *robustispina*)

Environmental Baseline

Status of the Species in the Project Area

Baseline information for Pima pineapple cactus (PPC) in Arizona shows surveys documenting PPC as early as 1935. More thorough surveys conducted in Arizona after 1991 along with research begun in 1993 provided further information about the reproductive biology, distribution, effects of fire, species mortality, and impacts from various threats. The best available baseline information is relatively recent and has been gathered in a narrow time span; it may not represent actual changes in distribution or population degradations. Those actual changes are likely greater than the numbers presented here.

A total of 2,384 individual PPC have been located by surveys conducted since 1935 and the majority were found after 1991, when more thorough methodology was used by searchers. Across the species' range, surveys document densities from 0.02 to 1.2 plants/ha (0.05-3.0 plants/ac). Based on the species' range, elevational and topographic limits, approximately 461,000 ha (1,152,000 ac) of potential habitat currently exists in southcentral Arizona.

Loss, fragmentation, and alteration of habitat from residential development and mining remain the primary threat to PPC. Most of the best habitat for PPC is reasonably certain to be converted by current and future urbanization and mining development. Other threats to the species include livestock grazing and associated activities, recreational off-highway vehicle use, increased proliferation of roads and trails, natural and prescribed fire and associated activities, and illegal collection for the cactus trade. Adverse effects of livestock grazing include trampling by livestock and horses, habitat loss, alteration, and degradation associated with construction of range improvements, vegetative manipulations (i.e., chaining, prescribed fire, seeding with nonnative plants, imprinting), and heavy grazing and overgrazing which results in erosion, changes in vegetative communities, hydrology, and microhabitats in the upland areas where the PPC occurs.

The Forest has surveyed 800 ha (2,000 ac) in the Huachuca and Santa Rita EMA's. These surveyed areas lie within the Proctor, Sierra Tordilla, Santa Cruz, and Alisos allotments. The Forest found two cacti on the Proctor allotment (west slope of the Santa Rita Mountains). All other located PPC have been on the other three above-named allotments (in the Patagonia Mountains). Small areas showing suitable habitat have also been surveyed in the Tumacacori EMA. One group of PPC, which has since died, was found on the Sopori allotment. Surveys have currently located 48 PPC occurring on the Forest.

Formal consultation on the Proctor and Santa Cruz AMP's and the Alisos/Sierra Tordilla term grazing permits was conducted in 1995 between the Forest and the Service. The proposed actions and conservation recommendations provided for protection of PPC have been or are being carried out (Mima Falk, Coronado National Forest, pers. comm., 1999).

Effects of the Action

Little is known regarding effects of low to moderate levels of livestock grazing on PPC distribution. A current study (on the Forest) is expected to quantify effects of livestock grazing on PPC. Patchy distribution, wide dispersal, and locations in upland, relatively xeric soils (Roller 1996) show PPC areas of suitable habitat may be areas less frequented by livestock than streams or wash bottoms. Heavy grazing and overgrazing may threaten PPC populations by increasing the probability of trampling and by altering surface hydrology and increasing erosion rates, which in turn may affect seed dispersal or seedling establishment of this cactus. Trampling of cacti is expected to occur under moderate and light grazing regimes but is expected to be a lower probability due to reduced livestock numbers. Effects of livestock grazing on PPC habitat can include erosion, hydrologic and microclimate changes, and invasion or expansion of nonnative grasses due to livestock preferences for native grass species over nonnatives.

Direct or indirect effects to PPC by livestock grazing (by impacting the structure and function of the ecosystem) are not well-studied. Heavy grazing, overgrazing, fire and fire suppression, drought, and introduction of nonnative plants (i.e., Lehman lovegrass) in arid grassland ecosystems are hypothesized as causing, individually or collectively, changes in arid grassland community structure and function (Bahre 1985). Livestock grazing can degrade habitat through damage and alteration of soils, vegetation communities, and cryptobiotic crusts. Invasion and expansion of Lehmann lovegrass, combined with fire, is a serious threat to PPC populations. Continuous distribution of fuels and greater biomass are hypothesized as increasing fire intensity across semidesert grasslands, including the often bare-ground refugia in which PPC occurs. Under these conditions, mortality of PPC after fire is elevated (Roller and Halvorson in press). Research shows fire increases Lehmann lovegrass distribution and suggests fire intensity and frequency increases with Lehmann lovegrass invasion (McPherson 1995). Livestock grazing can result in increased abundance and distribution of Lehmann lovegrass compared to the abundance of native grasses (McClaran and Anable 1992). Lehmann lovegrass has been seeded in many areas of Arizona, and on the Forest, in an attempt to improve rangeland for livestock use (Bahre 1995).

Conclusion

Based on actions taken by the Forest to reduce or eliminate adverse effects of livestock grazing on the cactus; the current knowledge that seems to show that PPC seems compatible with well-managed livestock grazing; small areas of habitat on the Forest; and that the general plant criteria for grazing actions are being properly applies, the Service concurs with the Forest's effect determination that the proposed action "may affect, but is not likely to adversely affect" the Pima pineapple cactus.

GILA TOPMINNOW

Environmental Baseline

The Gila topminnow formal section of this biological opinion, did not consider the Santa Cruz River in the San Rafael Valley. This section of the Santa Cruz River has similar historical use and impacts as Sonoita Creek, Cienega Creek, and Redrock Canyon. The Santa Cruz River headwaters begin in the San Rafael Valley in southern Arizona, flow south into Mexico, travel westward, and flow north again into the Santa Cruz Valley in southern Arizona.

Most of the project area is currently used for livestock grazing. Urban development is presently minimal, as are other intensive human developments (agriculture, recreational uses, etc.). The San Rafael Ranch, recently acquired by Arizona State Parks and The Nature Conservancy, will be managed as open rangeland with minimal development. Gila topminnow are known to occur in three springs and in the Santa Cruz River in the San Rafael Valley. These three springs contain small, localized drainages located entirely on private land. Topminnow are presently considered rare in the Santa Cruz River, as they have not been found (during surveys or informal visits) for several years. Gila topminnow currently occur downstream in that portion of the Santa Cruz River which passes through Mexico (W. L. Minckley, Arizona State University, pers. comm., 1998), before the river flows north again into the United States.

The BA notes the environmental baseline for the middle Santa Cruz River (north of Nogales) is very degraded. The primary, perennial water source is effluent from the Nogales international Wastewater Treatment Plant. High releases of ammonia appear problematic for all aquatic species including topminnow since the river immediately downstream from the sewage plant is frequently lacking fish and most other aquatic life. Gila topminnow occur downstream again (beyond this lifeless zone) to where the surface perennial water flow ends (usually around Tubac). Topminnow occur in Peck Canyon near its confluence with the Santa Cruz River. Nearly all of the Santa Cruz Valley that lies within 10 km (6 mi) of the Santa Cruz River is privately owned. Urban and commercial development and housing, along with other human infrastructure (ranches, agriculture, etc.) occurs in towns, on single parcels, and in large planned community developments. Humans access most of the available water through relatively shallow area wells, either communally or individually. Water flow in this section of the Santa Cruz River is relatively constant due to effluent from the sewage treatment plant. Riparian vegetation on the Santa Cruz River varies, but appears relatively healthy, with a mature cottonwood-willow gallery forest in the river channel. Nonnative fish species are present in all sections of the Santa Cruz River, including the western mosquitofish.

The BA notes watershed conditions for 10 of the 34 total allotments that are determined to "not likely to adversely affect" Gila topminnow are currently in unsatisfactory condition. Unsatisfactory watershed condition results when both soil and riparian conditions are analyzed and rated unsatisfactory. Riparian conditions are usually rated as unsatisfactory because certain age classes of riparian trees are under-represented. Livestock grazing is likely the primary cause of this, but recreation, off-highway vehicle use, mining and associated activities, are also contributors.

The BA notes range conditions for these same 10 allotments are mostly moderately high. The distance between the Forest boundary and occupied Gila topminnow habitat in the Santa Cruz

River varies from 5 to 16 km (3-10 mi). Most livestock grazing effects on the allotments are being considered using the short-term (on-going) grazing criteria.

Effects of the Action

Downstream effects of livestock grazing for Gila topminnow are discussed in the formal section of this biological opinion and are incorporated here by reference. Downstream effects to Gila topminnow, occupied habitat, suitable habitat, and potential habitat occur from livestock grazing on the 34 allotments. The effects of the action on these allotments are likely insignificant and discountable because of the short-term nature of these proposed actions.

Conclusion

The cumulative or additive effects of livestock grazing and other Forest programs and decisions are of concern. Data on the species' status is poor and knowledge of the environmental baseline is lacking. The accumulation of many deleterious impacts, both large and small over time from Federal and non-Federal actions presents obstacles to the conservation and recovery of the species. Based on the above discussion and the guidance criteria (USFS 1998a, 1998b), the Service concurs with the Forest's effect determination that the proposed action "may affect, but is not likely to adversely affect" the Gila topminnow. This concurrence is based on our assumption that long-term effects will be addressed during AMP formulation.